N73-32803

NASA CONTRACTOR REPORT

NASA CR-2273
VOL. III

NASA CR-2273 VOL. III

NUMERICAL ANALYSIS OF STIFFENED SHELLS OF REVOLUTION

Volume III of VII

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION • WASHINGTON, D. C. • SEPTEMBER 1973

1. Report No. NASA CR-2273	2. Government Accession No.	3. Recipient's Catalog No.
4. Title and Subtitle Numerical Analysis of Stiffened Shells of Revolution Volume III of VII *		5. Report Date September 1973 6. Performing Organization Code
7. Author(s) V. Svalbonas		8. Performing Organization Report No. M381
9. Performing Organization Name and Address Grumman Aerospace Corporation Bethpage, New York 11714		10. Work Unit No. 11. Contract or Grant No. NAS 8-27468
12. Sponsoring Agency Name and Address National Aeronautics and Space Administration Washington, D.C. 20546		13. Type of Report and Period Covered Contractor Report 14. Sponsoring Agency Code

15. Supplementary Notes

*A list of all seven volumes, by sub-title, is on the back side of this page

16. Abstract This report contains the information necessary for application of the STARS-2B, -2V (Shell Theory Automated for Rotational Structures-2 (Buckling, Vibrations)) programs. These new versions of the STARS programs retain the basic features contained in the STARS programs since 1963, i.e.

1. Arbitrary branching of the shell meridians.
2. Arbitrary boundary conditions.
3. Minimum input requirements to describe a complex, practical shell of revolution structure.
4. Accurate analysis capability using a minimum number of degrees of freedom.

The STARS-2B, -2V programs contain the following capabilities:

1. Stability analysis of shells of revolution under axisymmetric loading. The "worst meridian technique" may be used in cases of unsymmetric loading. Both eigenvalue and determinant calculation options are available.
2. Vibration analysis of shells of revolution including axisymmetric prestress effects.
3. Critical speed analysis of rotating shells of revolution including axisymmetric prestress effects.

The fundamental structural theory for the programs is detailed in Volume I of this series, while the Users' Manual for the statics program is Volume II.

17. Key Words (Suggested by Author(s))	18. Distribution Statement

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	459	6.00

VOLUME I. Theory Manual for STARS-2S, 2B, 2V Digital Computer Programs

VOLUME II. Users' Manual for STARS-2S - Shell Theory Automated for Rotational Structures - 2 (Statics), Digital Computer Program

VOLUME III. Users' Manual for STARS-2B, 2V - Shell Theory Automated for Rotational Structures - 2 (Buckling, Vibrations), Digital Computer Programs

VOLUME IV. Engineer's Program Manual for STARS-2S - Shell Theory Automated for Rotational Structures - 2 (Statics), Digital Computer Program

VOLUME V. Engineer's Program Manual for STARS-2B - Shell Theory Automated for Rotational Structures -2 (Buckling), Digital Computer Program

VOLUME VI. Engineer's Program Manual for STARS-2V - Shell Theory Automated for Rotational Structures -2 (Vibration), Digital Computer Program

VOLUME VII. Satellite Programs for the STARS System

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SYMBOLS

Lower Case Latin

a	semi-diameter perpendicular to Z-axis in ellipsoid
b	semi-diameter parallel to Z-axis in ellipsoid
f	distributed loads in local coordinates
h	shell thickness; face sheet thickness
i	index: beginning edge of shell segment; independent joint of kinematic link; subscript "inside"
j	index: ending edge of shell segment; dependent joint of kinematic link
n	index on harmonic
o	subscript "outside"
r	radius
s	index of segment; coordinate in cylinder or cone
t	core thickness in sandwich shell
w	normal deflection, positive inward

Upper Case Latin

C	stiffness eccentricity parameters; offset distance in ogive, ellipse
D	bending stiffness parameters
E	Young's modulus (lb/in^2)
F	lineal force (lb/in)
G	shear modulus (lb/in^2)
K	extensional stiffness parameters
M	bending moment on shell (in-lb/in)
N	membrane stress resultant (lb/in)
$\overline{N}$	assumed membrane stress resultant (lb/in)
Q	transverse shear stress resultant (lb/in)
R	radius; "global" coordinate, positive radially outward.

SYMBOLS (continued)

T temperature; "global" coordinate, tangential

X Cartesian coordinate, $\theta = 0$ at X-axis

Y Cartesian coordinate

Z Cartesian and "global" coordinate, coincides with axis of revolution

Greek

α angle between rotated coordinates

β ratio of semi-diameter parallel to Z-axis in ellipsoid to semi-diameter perpendicular to Z-axis

γ shear strain; non-linear parameter; angle of inclination of kinematic link

ζ normal coordinate, positive inward

θ circumferential angular coordinate (rad)

λ shell parameter

ν Poisson's ratio

σ normal stress (lb/in^2)

τ shear stress (lb/in^2)

ϕ meridional angular coordinate (rad)

ω rotational displacement (rad)

Ω rotational displacement in "global" coordinates (rad)

Δ displacements in fixed or "global" coordinates

Λ segment length parameter

Miscellaneous

eq equivalent

$s\phi$ $\sin \phi$

$c\phi$ $\cos \phi$

Other symbols are defined in the text where used.

SECTION 1

PROGRAM CAPABILITY

The use of an accurate shell theory to analyze structural shell problems usually involves complex mathematics and numerical techniques, which are nearly impossible to treat without the aid of automated procedures. On this basis, digital computer programs based upon the Love-Reissner first order shell theory have been developed. These programs can perform a stability or vibration analysis of orthotropic thin shells of revolution, subjected to axisymmetric distributed loading or concentrated line loads, as well as thermal strains (Reference 1). Furthermore, a shell with arbitrary boundary conditions, under loads which vary arbitrarily with position and under a temperature variation through the thickness, is tractable with these programs. The shell can consist of any combination of the following geometric shapes:

1) Ellipsoidal - spherical (offset from the axis of revolution allowed)
2) Ogival - toroidal
3) Modified ellipse shape
4) Conical - circular plate
5) Cylindrical
6) General point input geometry
7) Dummy geometry slot to be filled by the user
8) Discrete ring

The shell wall crossection can be a sheet, sandwich, or reinforced sheet or sandwich. The reinforcement can consist of rings and/or stringers, a waffle construction rotated at any angle to the principal coordinates, or an isogrid construction. General stiffness input options are also available. The reinforcement material properties can differ from those of the main shell, and a temperature variation can cause different properties in the two face sheets of a sandwich shell.

The basic approach to the problem (Reference 1) is to cut the structure into several shell regions. These regions need to be singly-connected shells, and can only have line loads applied at their end points. There are no restrictions on geometry, or uniform or thermal loads. The regions are further subdivided into several shell segments, each being free to have its own geometric shape, provided that the shape falls into one of the categories mentioned above.

Stiffness matrices obtained for each segment, are coupled by standard matrix methods to obtain region stiffnesses, which, after being reduced in size, are in turn coupled to form the total shell structure under analysis. Currently, the UNIVAC 1108 computer programs are sized to handle a structure composed of up to 29 segments in each of 29 regions arbitrarily connected to each other. There is a limitation on the size of a shell segment, which is a consequence of the demand that boundary disturbances be felt throughout the segment. This limitation is mathematically described in Section 2 (pages 2-31 to 2-33) as a length parameter. This parameter, however, is not reliable near the apex of any shell shape ($\phi = 0$), and the segments needed in this region are actually much smaller than predicted by the parameter. A mathematical singularity occurs at the apex where r_o (the radius of revolution) becomes zero. It is this singularity which prevents the length parameter from being meaningful near the apex. Furthermore, the point ($\phi = 0$) is not an acceptable input point of the program (except for the torus-ogive and offset ellipsoid), although any point outside a circle of infinitesimal radius is satisfactory.

There is a considerable latitude in what can be done within each shell segment. The thickness of any segment can be symmetrically tapered and it can contain up to 14 points of discontinuity, provided that the segment centerline remains continuous and describable by a single shell geometry. A temperature distribution through the thickness can be specified at three points in a homogeneous shell, and 4 points in a shell of rigid core sandwich construction. The distribution is considered to be linear between these points. Thus, it is possible to approximate temperature distributions other than linear distributions. In the event of physically discontinuous shell centerlines, a kinematic link is available for use in the analysis. The link relates displacements across the discontinuity. This link may be used between regions, and between segments within a region. Discrete offset rings are also available for use within or between regions.

SECTION 2

INPUT INFORMATION

2.1 GENERAL NOTES

The preceding section provides some insight into the capability of the programs, and the potential that they might have for future use. If the programs are applied judiciously they can be extremely powerful tools. The mechanics of applying them should be clearly understood. With this in mind, the remaining section should be studied carefully.

The required input data may be subdivided into three main parts, namely: geometric, topological (or coupling orientation) and joint data (degree of freedom description for each joint component). Each segment requires its own geometric configuration and numerical integration control.

The output consists of stiffness coefficients for each shell segment and the actual symmetry of the coefficients is presented in a convenient form for a check on the accuracy of the integration through the segment. Region stiffnesses and their symmetry checks are also provided. Eigenvalues and final eigenvectors are printed out for each shell segment at intervals along the segment as specified by the user of the program. The output will be further discussed in Section 3.

The present program size is described in the table below.

UNIVAC 1108 Table of Program Sizing

I.	Segments per region:	29
II.	Segment joints per region:	30
III.	Regions:	29
IV.	Region joints:	30

V.	Number of points available per segment for specifying geometric or load data:	30
VI.	Number of points available through the thickness for specifying temperature data:	4
VII.	Geometries:	ellipsoid, sphere, offset ellipsoid, modified ellipsoid, ogive, toroid, cone, annular plate, cylinder, general geometry, ring, elastic support, dummy geometry.
VIII.	Wall cross-section options:	single sheet, equal face sheet sandwich, unequal face sheet sandwich, eccentric reinforcement (rings, stringers or both), waffle reinforcement rotated at an arbitrary angle to coordinate axes, isogrid reinforcement, arbitrary stiffness input.
IX.	Number of material property tables per submission:	10
X.	Number of points per material property table:	10
XI.	A combined fixed and variable loading option is available.	
XII.	Orthotropy options:	isotropic or orthotropic sheet, isotropic or orthotropic sandwich, isotropic or orthotropic sandwich with different face sheet properties caused by thermal gradients, isotropic or orthotropic sheet or sandwich reinforced by different property rings or different property stringers or both, isotropic or orthotropic sheet or sandwich reinforced by a different property waffle system rotated by an angle β to coordinate axes, isotropic or orthotropic sheet or sandwich reinforced by a different property general isogrid reinforcing system, arbitrary stiffness input options used to describe other configurations.

UNIVAC 1108 Table of Program Sizing (continued)

XIII.	Number of rings per region:	28
XIV.	Total number of rings at region joints in structure:	28

Figure 2-1 shows the detailed option flow chart for the present programs.

GENERAL NOTES - Idealizations

Before discussing the specific card input order, it would be advantageous to introduce some general guidelines in the area of idealizations and topology. In many computer programs there is such an abundance of numerical computation, that minimizing numerical roundoff errors becomes as important as getting the final answers. In some cases the engineer can aid the program in this effort throught the use of judicious idealizations. Such a possibility exists in the STARS-2 programs, since many internal operations are involved with building and inverting stiffness matrices. The object of the user therefore, should be to help the computer by avoiding the creation of ill-conditioned matrices at any step (see Reference 2). Physically, the way to achieve this end is to have all the segment stiffness matrices of the same order of magnitude. This will in turn produce region stiffness matrices which are of similar orders of magnitude, and minimize possible ill-conditioning in the total structure matrices. The user can help to achieve this end by sizing his segments in such a way so that no short stiff segment is contained alone in a region with all other long flexible segments, or that no region comprised of all short stiff segments exists in a structure whose other regions contain only long flexible segments. No accurate measure can be given on the relative stiffness or flexibility of segments allowed, and thus the best check is

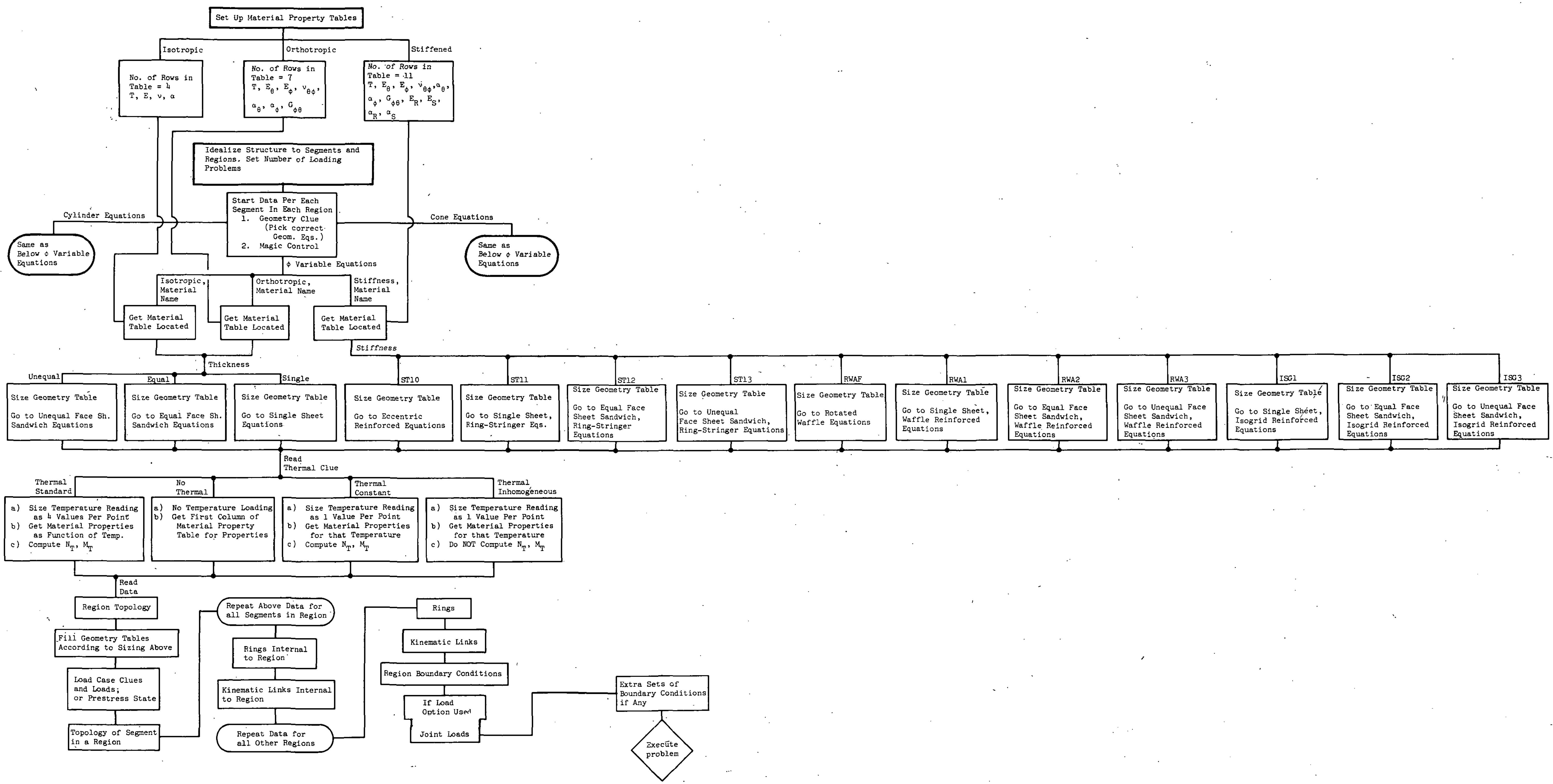


Figure 2-1 Program Option Flow Chart

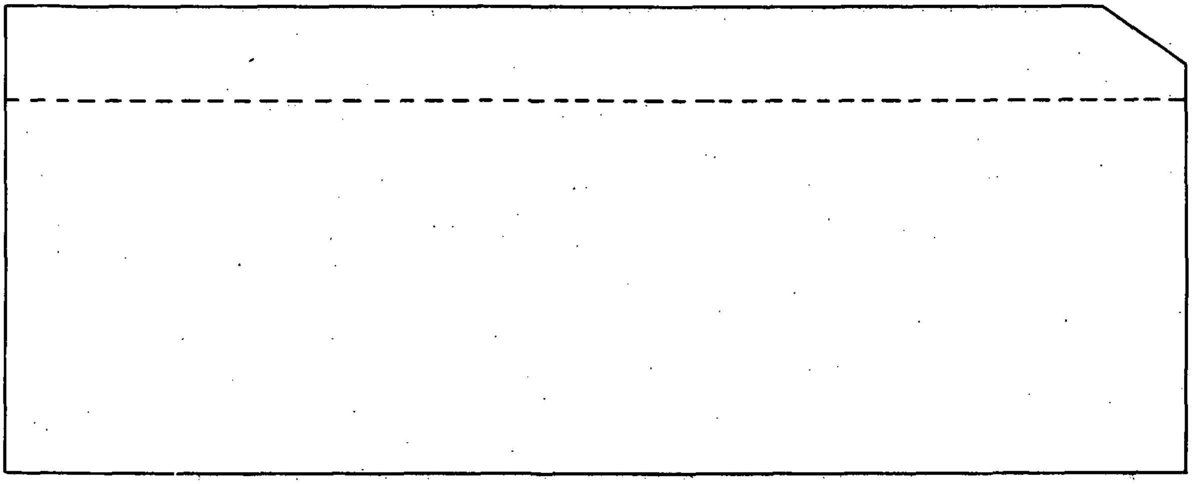
to see if a structure is in equilibrioum under the applied loading. It also must be kept in mind, that if an idealization has provided useful results for axisymmetric (zeroth harmonic) loading, it need not necessarily be a good idealization for other harmonics, but if good results are obtained for the first harmonic, then other harmonics should also encounter no adverse behavior. The symmetry checks of segment and region stiffness matrices are useful for many reasons, but will not necessarily alert a user to ill-conditioning.

In the use of regions, one other type of accident must be avoided. This is the creation of a single region structure with both ends fixed, wherein no suitable boundary condition matrix can be formed. Thus, in the use of region idealizations, which are less physically meaningful to a user than pure segment idealizations, care should be taken so that all boundary conditions are not zeroed out. To avoid this problem, and to minimize program running time, it is best to maximize the number of regions in a structure, and minimize the number of segments per region. Thus, in small problems, for best numerical efficiency, there should only be <u>one</u> segment per region.

In the solution of the static axisymmetric problems, and the $n = 0$ eigenvalue search, all torsional degrees of freedom should be removed. A second boundary condition matrix should be input for searching for eigenvalues in other ($n \neq 0$) harmonics.

GENERAL NOTES - Data debugging

The STARS programs have been provided with special separate data debugging packages called SATELLITE programs. In order to be able to debug as much of a given data deck as possible in one computer submission, the data is grouped by inserting special cards, termed "dash-separator cards", appropriately. In order so that additional errors are not made by requiring insertion and removal of these cards, the STARS program has been coded to accept these dash-separator cards in the input. A dash-separator card is shown below:



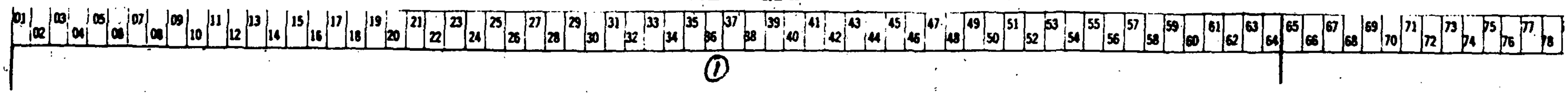
As can be seen, a minus symbol is inserted straight across the computer card from column 1 through column 80.

Since the dash-separator cards subdivide the data deck, there exists the possibility that a separated data block may be completely omitted (for example no kinematic links in a structure). In this case one dash-separator card is also omitted. Under no circumstances can there exist two adjacent dash-separator cards in a data deck. The SATELLITE programs are described in Reference 3.

2.2 CARD FORMATS

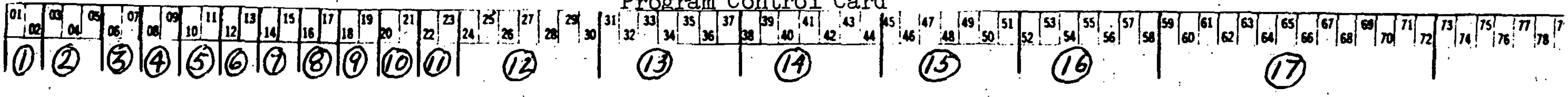
The following different card formats are presently required by the STARS-2B, -2V programs. A full description and explanation of the information to be entered on the cards is presented in Section 2.3.

Title Card



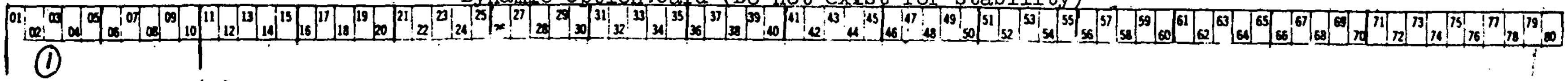
(1) Alphameric Title 16A4

Program Control Card



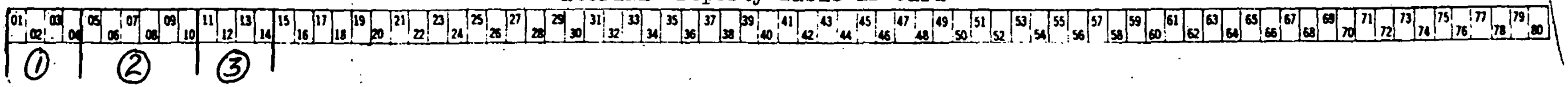
(1)	Number of regions	I2
(2)	Total number of segments	I3
(3)	Number of material property tables	I2
(4)	First harmonic in search	I2
(5)	Last harmonic in search	I2
(6)	Search increment	I2
(7)	Number of loadings	I2
(8)	Number of boundary conditions	I2
(9)	Stress input clue (<u>blank for vibrations</u>)	I2
(10)	Output clue	I2
(11)	Problem solution procedure clue	I2
(12)	Convergence tolerance	F7.0
(13)	Upper cutoff	F7.0
(14)	Largest load step	F7.0
(15)	Smallest load step	F7.0
(16)	Mass perturbation multiplier (<u>blank for stability</u>)	F7.0
(17)	Frequency estimate (<u>blank for stability</u>)	E14.7

Dynamic Option Card (Do not exist for stability)



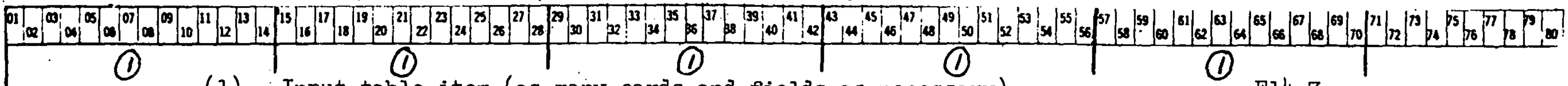
(1)	Dynamic Problem Identification	A4
(2)	Eigenvector Identification	I6

Material Property Table ID Card



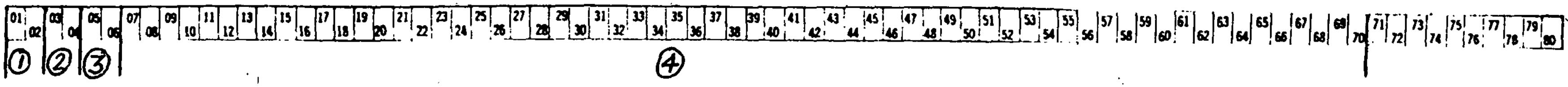
(1)	Material Name	A4
(2)	Blank	-
(3)	Table Type	A4

Materials Property Table, Geometry, Position, Crossection, Loading, Prestress (not for vibrations), Ring-Thermal, and Ring Prestress or Dynamics Cards.



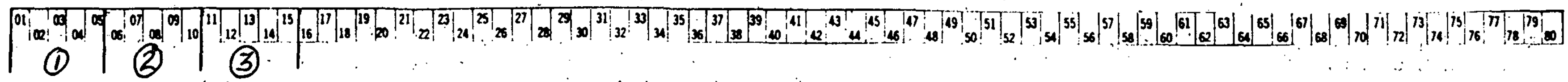
(1)	Input table item (as many cards and fields as necessary)	E14.7

Region Introductory Card



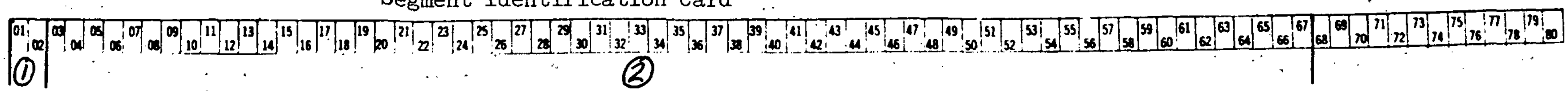
(1)	Number of segments	I2
(2)	Number of kinematic links	I2
(3)	Number of rings	I2
(4)	Title	16A4

Topology Cards, (Region Joint Control Card)



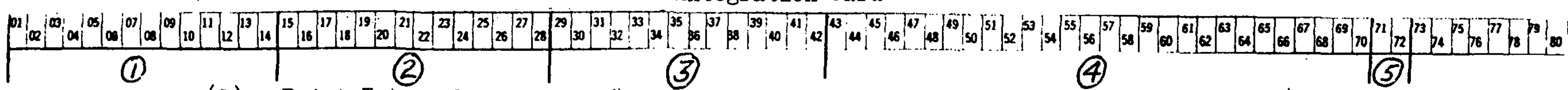
(1)	Region or segment number, (number of joints)	I5
(2)	Beginning joint, (number of rings)	I5
(3)	End joint, (number of links)	I5

Segment Identification Card



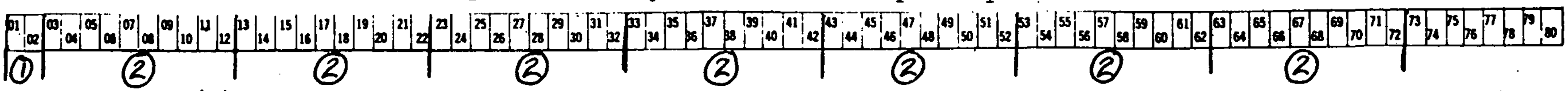
(1)	Segment code	F2.0,
(2)	Title	16A4

MAGIC Integration Card



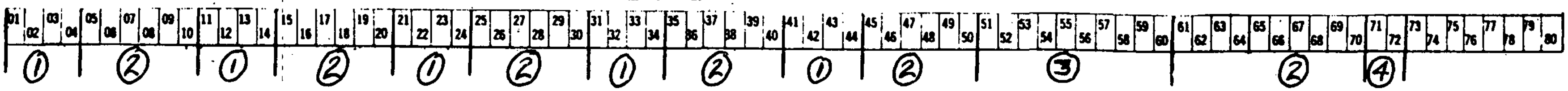
(1)	Print Interval	E14.1
(2)	Accuracy control	E14.1
(3)	Integration interval	E14.1
(4)	Blank	-
(5)	Step control	F2.0

Special Geometry Card for Point Input Shape



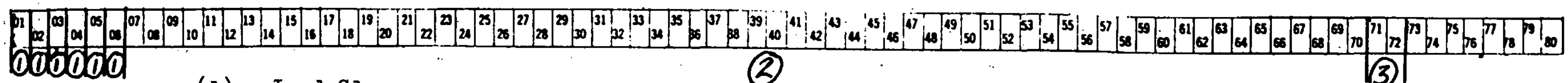
(1)	Number of input points	I2
(2)	Input points (as many pairs as specified)	F10.0

Master Clue Card



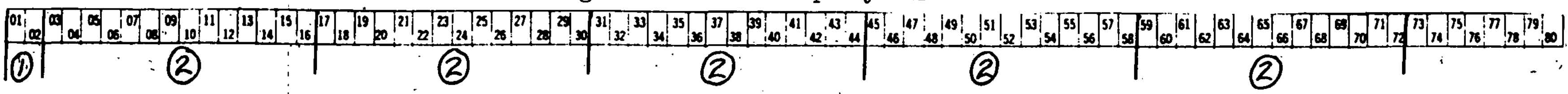
(1)	Clues	A4
(2)	Blank	-
(3)	Stress Free Temperature	E10.1
(4)	Number of Table points	I2

Loading Clue Card



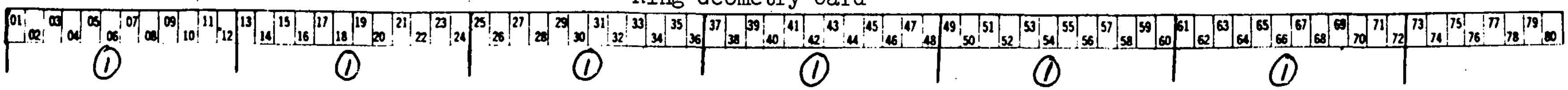
(1)	Load Clues	I1
(2)	Title	16A4
(3)	Table Control (on multi-harmonic cards)	I2

Ring Location and Property Card



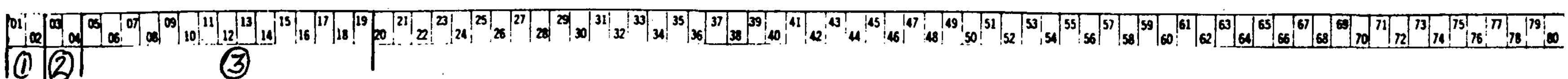
(1)	Ring joint number	I2
(2)	Ring properties	E14.7

Ring Geometry Card



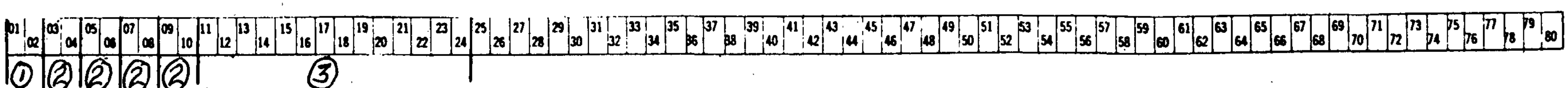
(1) Ring geometric properties — E12.5

Kinematic Link Cards



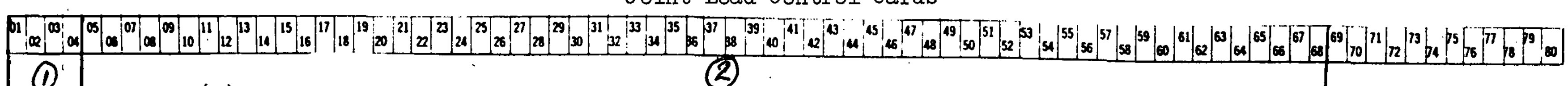
(1) Dependent joint — I2
(2) Independent joint — I2
(3) Angle of inclination — E14.7

Boundary Condition Card



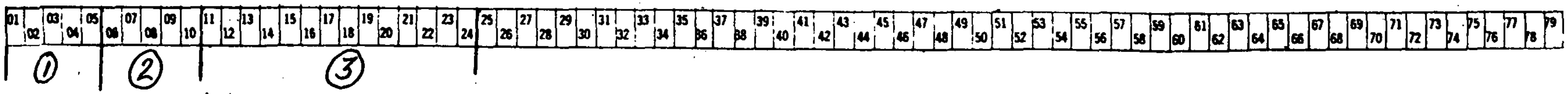
(1) Joint Number — I2
(2) Boundary conditions — F2.0
(3) Axis rotation angle — E14.1

Joint Load Control Cards



(1) Number of joint loads — I4
(2) Title — 16A4

Joint Load Cards



(1)	Load condition number	I5
(2)	Row Identification	I5
(3)	Applied load	E14.7

.3 DETAILED ORDER OF INPUT (See Figures 2-1, 2-2)

GENERAL INTRODUCTORY CARDS	Column	Format
1. Title Card		
A. Alphameric title (submission description)	1-64	16A4
2. Program Control Card		
A. Number of regions to be coupled (Max. = 29)	1-2	I2
B. Total number of segments (Max. = 29 x 29 = 841)	3-5	I3
C. Number of Material Property Tables (Max. = 10)	6-7	I2
D. First harmonic in the range to be searched for stability or vibration eigenvalues.	8-9	I2
E. Last harmonic in the range to be searched for stability or vibration eigenvalues.	10-11	I2
F. Search harmonic increment	12-13	I2
G. Number of loading conditions for this problem (See Dynamic Option Card for Vibration problems)	14-15	I2
In a stability analysis two types of loadings may be applied simultaneously. The first loading will be considered as being of constant fixed magnitude, while the second will be considered as being the variable (eigenvalue) loading. In this case the number of loading conditions is set to 2. If there is no fixed load applied, then the number of loading conditions is 1.		
H. Number of boundary conditions for this problem.	16-17	I2
In some cases (such as shells containing an apex) boundary conditions must be changed for the first few harmonics. An option thus exists of using up to 3 different boundary condition sets in an eigenvalue analysis. For example, if the first eigenvalue sought is for the n = 0 harmonic, torsion degrees of freedom should be removed. For eigenvalue searches in other harmonics torsional freedom should be retained by using a second set of boundary conditions.		

		Column	Format
I.	Prestress input clue	18-19	I2

If this clue is set to zero, the program will expect load input, and will calculate the prestress state by itself. In considering the prestress state it will include the effects of predeformation.

If this clue is set to unity, the program will expect the prestress state to be input, and will assume there is no predeformation. If there are two loading conditions (item G above), the program will expect two sets of input prestress states.

The prestress input clue set to unity may also be used to obtain estimates of buckling under unsymmetric loading by inputing the "worst meridian" stress distribution as an axisymmetric condition. This technique has been justified experimentally for cylinders under some loading conditions [4].

J.	Intermediate print clue	20-21	I2

If this clue is set to unity, base stiffness and prestress stiffness matrices for segments, regions, and structure will be printed for all estimates in all harmonics. To delete this intermediate print the clue should be set to zero.

K.	Eigenvalue calculation clue	22-23	I2

If this clue is set to zero an eigenvalue matrix procedure will be used for buckling load or vibration frequency calculations [1]. If this clue is set to unity a determinant evaluation procedure will be used [1]. Since the determinant evaluation procedure is much longer and can skip roots based on user input, it is not recommended for practical analysis.

L.	Convergence Tolerance	24-30	F7.0

If this is left blank and an eigenvalue procedure is used for calculations, the iterations will be carried on until successive estimates of the eigenvalue differ by less than 1.0%. Otherwise the user can input his own convergence tolerence (in decimal form, not %).

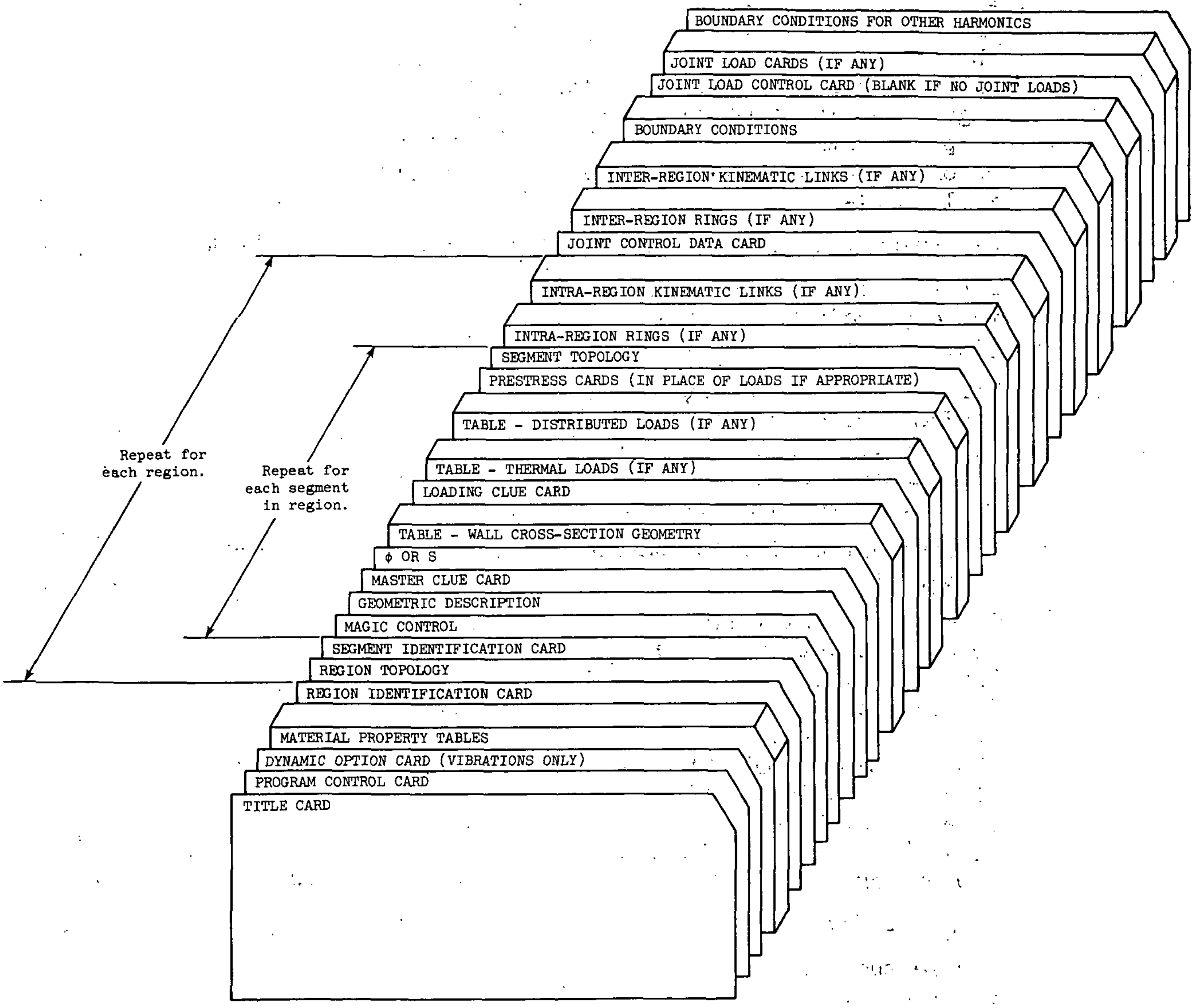


Figure 2-2 Data Sequence

		Column	Format
M.	Upper cutoff value	31-37	F7.0

This input is mainly relevant for stability calculations although it will be used for vibrations if input. If the user wishes to speed his computer search time by disregarding any eigenvalues higher than a specific ratio on his input prestress state, he may input this ratio here. Thus if 2.5 is input, all harmonic calculations where the minimum eigenvalue is found to be greater than 2.5x (input prestress state) will be aborted. The cutoff value will not be used if this field is left blank.

N.	Determinant evaluation largest increment	38-44	F7.0

Input here and item O will be disregarded if the eigenvalue calculation option is used (item K above).

This is the initial load step (input as a decimal, used as a percent) used for the loading variation in the determinant calculation option. If this field is left blank the program will use 5%.

O.	Determinant evaluation smallest increment multiplier	45-51	F7.0

This is the multiplier for the initial load step which will determine the smallest load step. The multiplier can start at 1.0 and should decrease in a factor of 10 to (for example) .1, or .01, .001 etc. Thus for an input of .05 above (item N) and .01 here, the load will first be changed by 5%, then .5%, and finally .05% (=5%x.01) as convergence increases. If this field is left blank the program will use 1.0 making the smallest step = to the initial step.

P.	Harmonic Mass Multiplier (for vibrations only)	52-58	F7.0

To use the harmonic mass multiplier see Reference 1 and the Dynamic Option Card. This entry is not necessary for a free or prestressed vibration problem, or a free or prestressed critical speed problem.

Q.	Frequency or Angular Velocity in rad./sec. (for vibrations only)	59-72	E14.7

The assumed value of the frequency of interest (see Dynamic Option Card).

	Column	Format
3. Dynamic Option Card (omitted for stability)		
A. Dynamic Analysis Description Clue	1-4	A4

There are six possible dynamic analysis options, each defined by a code word. If the run is to be a free vibration analysis (unloaded shell), the code word is FREV and item G on card 2 should be zero.

If the run is to be a vibration analysis of a pre-stressed shell, the code word is to be VPRE and item G on card 2 should be unity. If the run is to be a critical rotation speed analysis, the code word is CRSP and item G on card 2 should be unity.

If the run is to be a critical rotation speed analysis of a prestressed shell, the code word is PCRS and item G on card 2 should be two.

If the run is to be a critical rotation speed analysis including mass perturbation (see Ref. 1), the code word is CRSR and item G on card 2 should be unity.

If the run is to be a critical rotation speed analysis of a prestressed shell including mass perturbation (see Ref. 1), the code word is PCSR and item G on card 2 should be two.

	Column	Format
B. Eigenvector Clue	5-10	I6

If this clue is zero the lowest two eigenvectors will be sought and printed for each harmonic. If this clue is unity the two eigenvectors corresponding to the frequencies closest to the estimated frequency will be sought and printed for each harmonic.

	Column	Format
C. Rigid Body Mode Clue	11-15	I5

The n - 0, 1 harmonics contain rigid body modes for a totally unsupported (free) shell. If an analysis for other modes in these harmonics is required for this type of shell, the clue is set to unity. In this case the total harmonic search can only encompass n = 0,1. The first two eigenvalues in the output should then approximate zero, and the third will be the first to correspond to a nonrigid body mode. In all other cases (including a free shell investigated for harmonics $n \geq 2$), the clue is zero.

MATERIAL PROPERTY TABLES (Max. = 10 sets)

As many sets of these cards are used (10) as there are different material property segments in the structure to be analyzed. These tables will be used to obtain the thermal variation of material properties if thermal loadings exist. Thus the range of temperature in this table should be greater than that of the thermal loads. If no thermal loads exist, the values given in the first column of this table will be used, and the rest of the table can be left blank. If there are thermal loads, the range of the table is to be considered as that between the second and tenth columns.

1. Identification Card

   A. Material Title (Alphameric) — Column 1-4 — Format A4

      Any name can be made up as long as it is consistently used on the segment cards to which it refers. The same name cannot appear on more than one (1) table.

   B. Type of Table — Column 11-14 — Format A4

      One of several possible alphameric clues is written here. These clues serve to size the number of cards in the property table, and define which properties belong on which card. The possible clues are:

      ISOT
      ORTH
      STIF

      Their definitions are provided in Item 2 below.

2. Material Property Cards

   The material property cards below are given depending upon which table type clue is used. If the table type clue is "ISOT" (isotropic table):

   A. Temperature values (5 values per card; 2 cards) — Format 5E14.7

      These are the temperatures at which the values of material properties will be given. The first value in the table must always be the room or stress-free temperature, since the material properties in only the first column of the table will be used in an analysis involving no thermal load. The values of temperature in table columns 2 through 10 must be in algebraically increasing order.

   B. Values of Young's Modulus at the given temperatures. (5 values per card; 2 cards) — Format 5E14.7

   C. Values of Poisson's Ratio at the given temperatures. (5 values per card; 2 cards) — Format 5E14.7

   D. Values of the thermal coefficient of expansion at the given temperatures. (5 values per card; 2 cards) — Format 5E14.7

MATERIAL PROPERTY TABLES (continued) Column Format

If the table type clue is "ORTH" (orthotropic table):

A. Temperature values. 5E14.
(5 values per card; 2 cards)

These are the temperatures at which the values of material properties will be given.

B. Values of Young's Modulus in the θ direction (E_θ) at the given temperatures. 5E14.
(5 values per card; 2 cards)

C. Values of Young's Modulus in the ϕ direction (E_ϕ) at the given temperatures. 5E14.
(5 values per card; 2 cards)

D. Values of the Poisson's Ratio $\nu_{\theta\phi}$ at the given temperatures. 5E14.
(5 values per card; 2 cards)

E. Values of the thermal coefficient of expansion in the θ direction (α_θ) at the given temperatures. 5E14.

(5 values per card; 2 cards)

F. Values of the thermal coefficient of expansion in the ϕ direction (α_ϕ) at the given temperatures. 5E14.

(5 values per card; 2 cards)

G. Values of the Shear Modulus $G_{\phi\theta}$ at the given temperatures. 5E14
(5 values per card; 2 cards)

If the table type is "STIF" (table to be used for reinforced shells):

A.-G. The values in these locations are the same as those above for the "ORTH" clue case, and refer to the basic shell. 5E14

H. Values of ring Young's Modulus (E_R) at the given temperatures. 5E14
(5 values per card; 2 cards)

I. Values of stringer Young's Modulus (E_s) at the given temperatures. 5E14
(5 values per card; 2 cards)

J. Values of ring thermal coefficient of expansion (α_R) at the given temperatures. 5E14

(5 values per card; 2 cards)

K. Values of stringer thermal coefficient of expansion (α_s) at the given temperatures. 5E14

(5 values per card; 2 cards)

	Column	Format
Note: In a rotated waffle or isogrid construction, items H and I, and J and K, refer to the grid directions and are respectively identical.		
D-A-S-H S-E-P-A-R-A-T-O-R C-A-R-D (See General Notes - Data Debugging)		minus in 1-80

REGION INTRODUCTORY CARDS

These two cards are placed at the beginning of each region data information. Each region contains the following data set (see Figure 2-2): a) Two region introductory cards; b) data cards for each segment within the region; c) ring cards describing the discrete rings within the region, if any; and d) kinematic link cards describing the kinematic links within the region, if any.

	Column	Format
1. Identification Card		
A. Number of segments within the region (≤29)	1-2	I2
B. Number of kinematic links between segments within the region.	3-4	I2
C. Number of discrete rings between segments within the region.	5-6	I2
D. Any alphameric information (region description)	7-70	16A4
2. Topology Card (Coupling Orientation)		
A. Region Number Number of the region under consideration.	1-5	I5
B. Joint (i) Joint associated with i^{th} (beginning) end of the region.	6-10	I5
C. Joint (j) Joint associated with j^{th} (ending) end of the region.	11-15	I5

There is no coordinate flow in regions (unless 1 region = 1 segment), such as that shown for segments in Figures 2-3 to 2-9. However, the start joint of a region must match with 1 in segment numbering, and the end joint must match with the highest segment joint number in the region (see Figure 2-12 and page 2-54). If 1 region = 1 segment the segment topology card will be a dummy card [1 1 2] (see page 2-54).

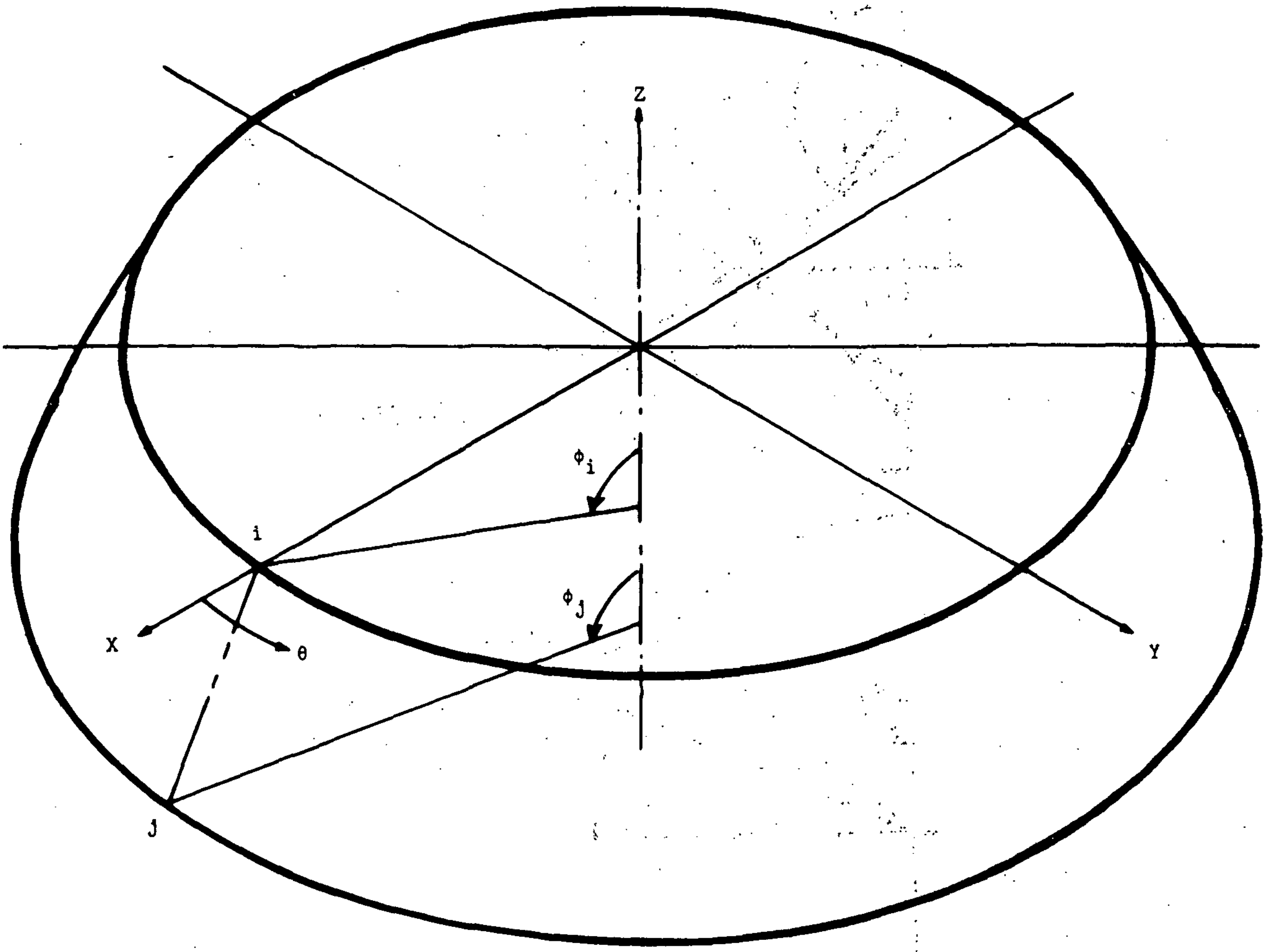


Figure 2-3. Typical Shell Segment

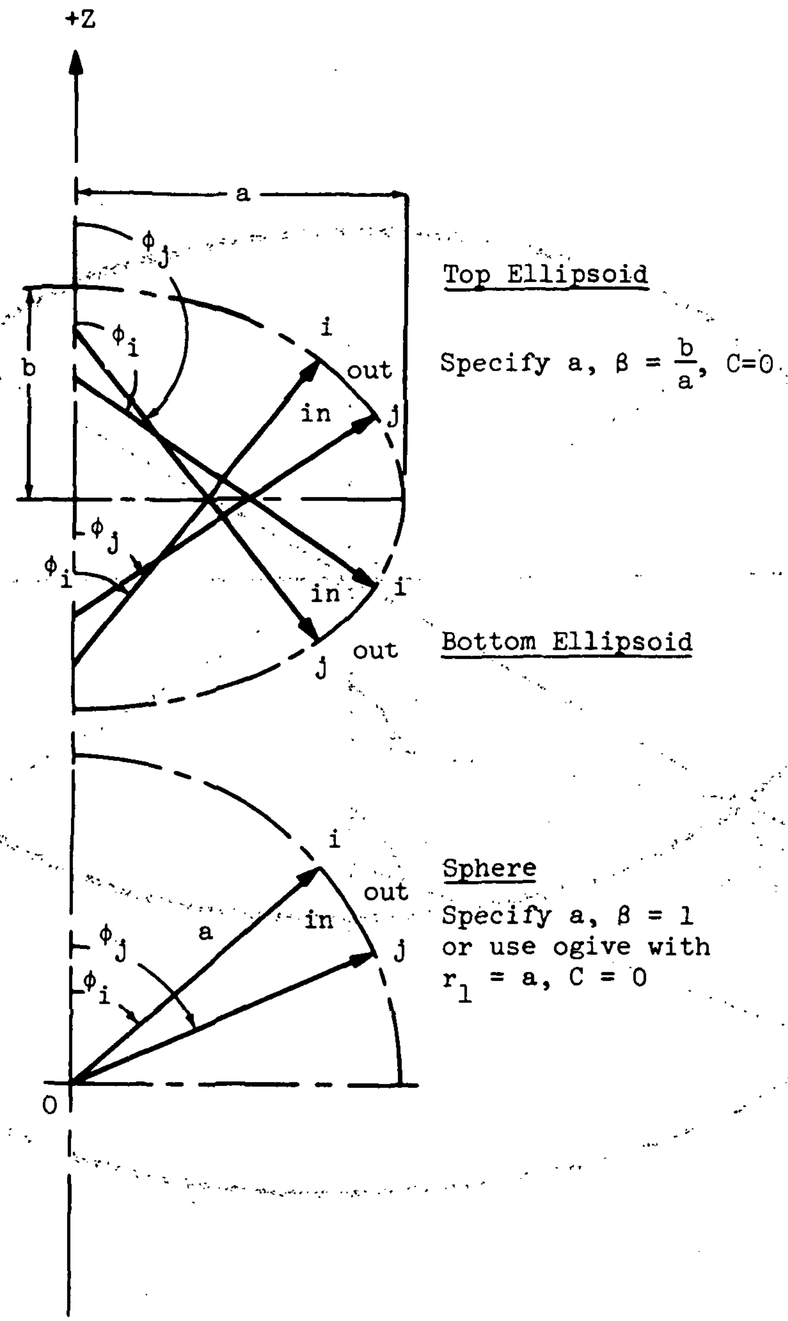


Figure 2-4a. Ellipsoid

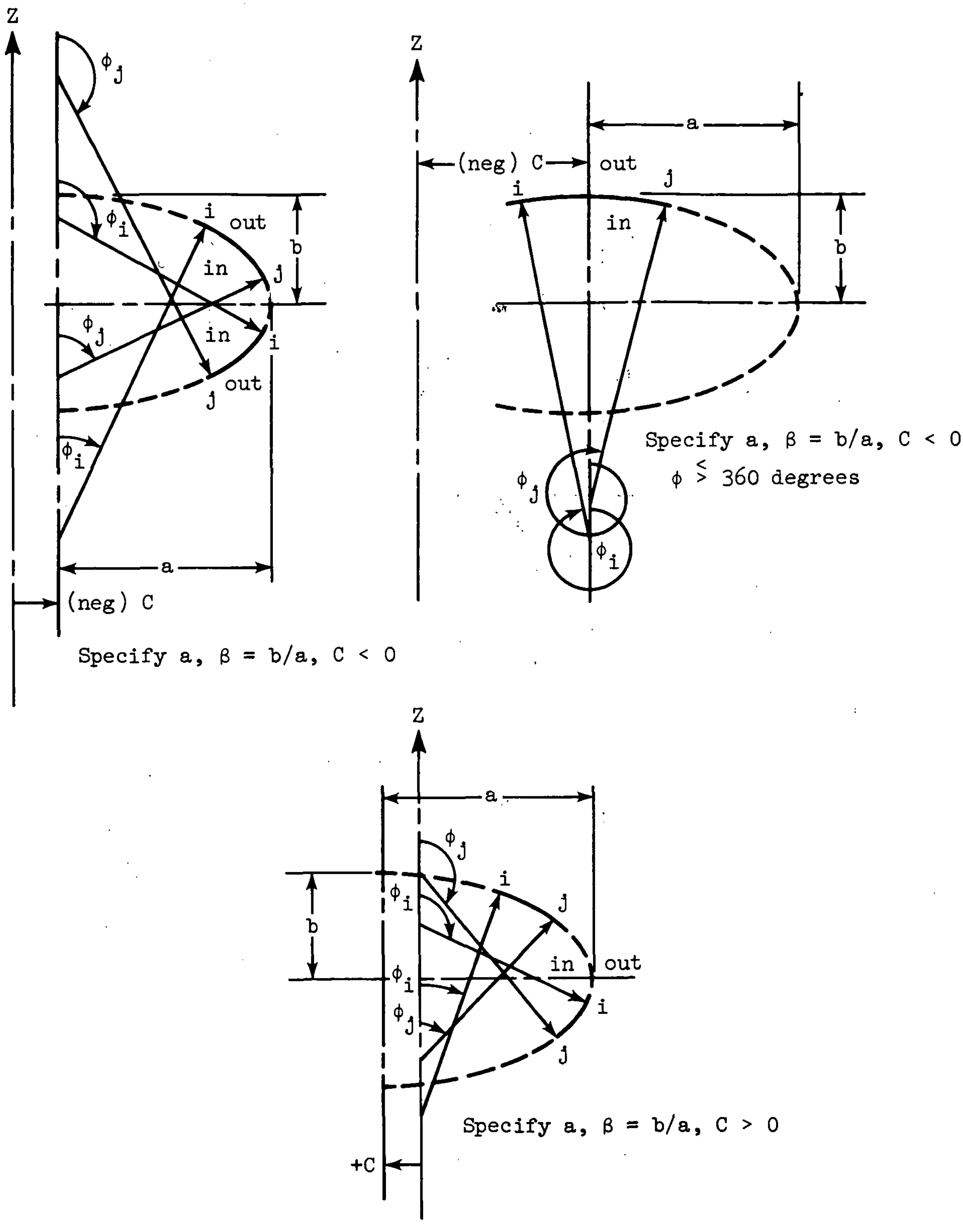
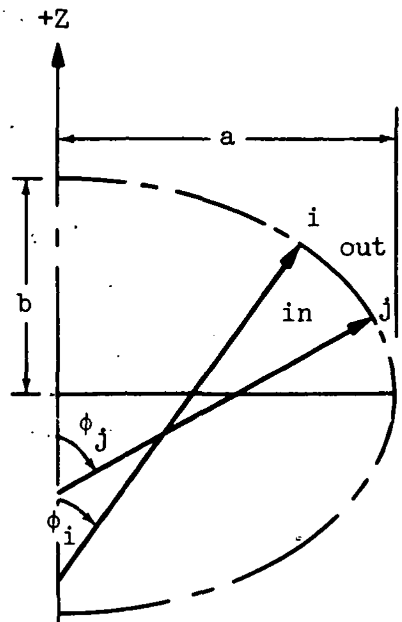


Figure 2-4b. Translated Ellipsoid



Specify n,a for:

n = 1	b/a = 0.707
n = 0	b/a = 0.666
n = -1/2	b/a = 0.639
n → -1	b/a → 0.618

Figure 2-5. Modified Ellipsoid

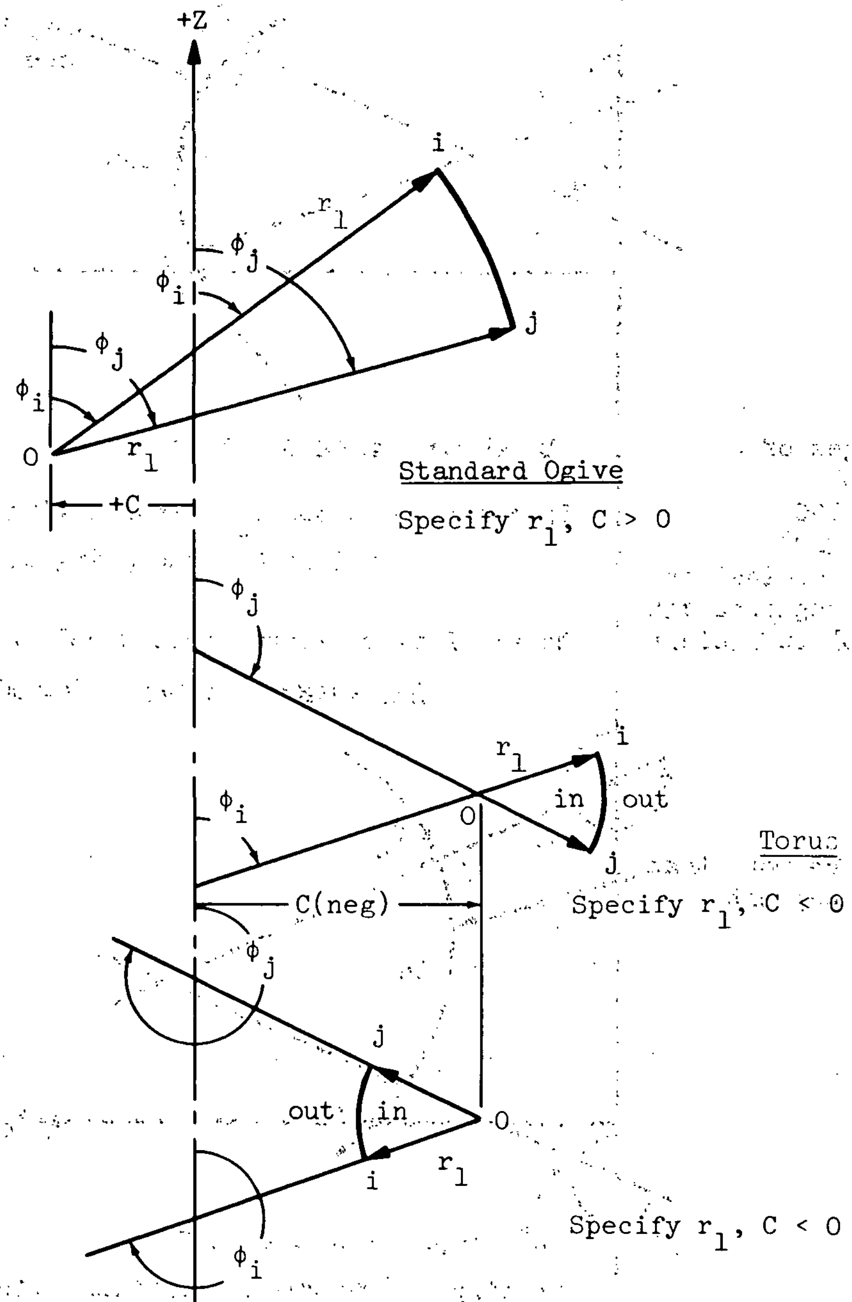
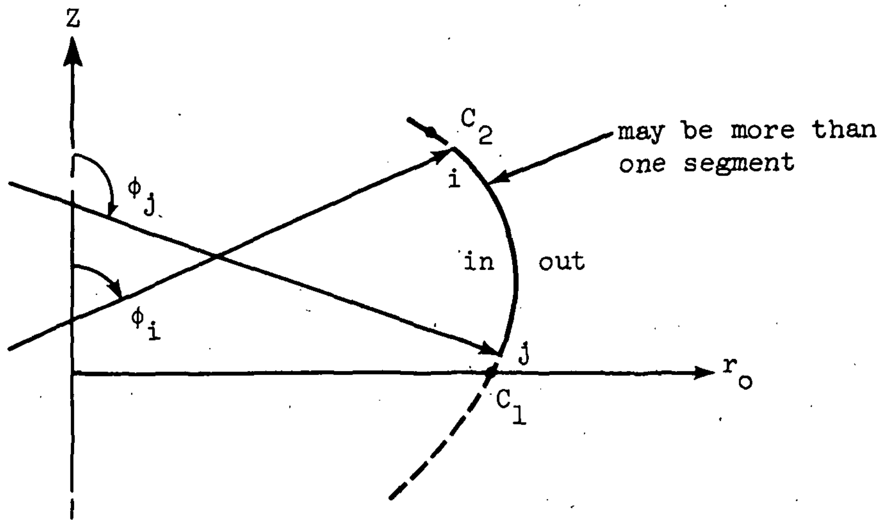


Figure 2-6. Ogive

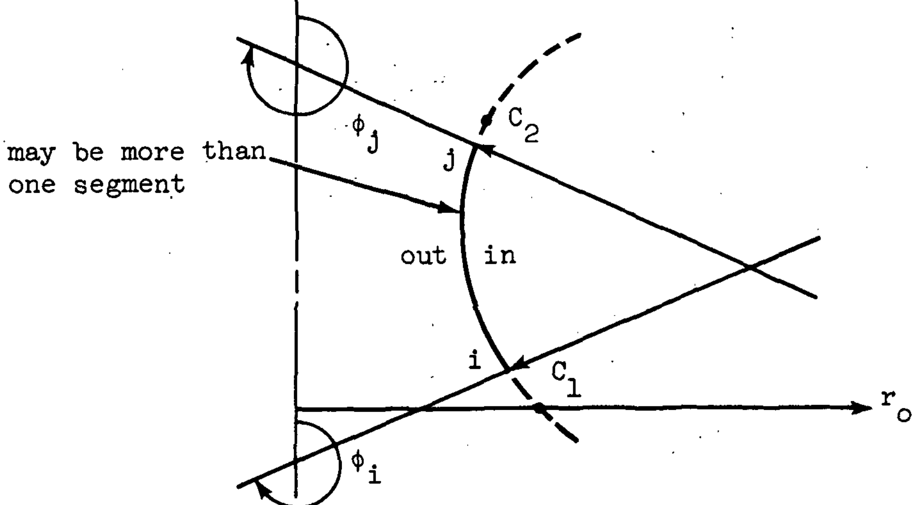


In the ranges of ϕ
$0° \leq \phi < 10°$
$170° < \phi < 190°$
$350° < \phi \leq 360°$
spherical, toroidal or elliptical segments can be used with sufficient accuracy.

"B" shape $10° \leq \phi \leq 170°$

Specify: Z versus r_o starting with
Z = 0 at C_1, and going to C_2.

Note: Z vs r_o input table should overlap
<u>total</u> range of ϕ input for <u>all</u> segments.



"A" shape $190° \leq \phi \leq 350°$

Specify: Z versus r_o starting with
Z = 0 at C_1, and going to C_2.

Note: Z vs r_o input table should overlap
<u>total</u> range of ϕ input for <u>all</u> segments.

Figure 2-7. General Geometry

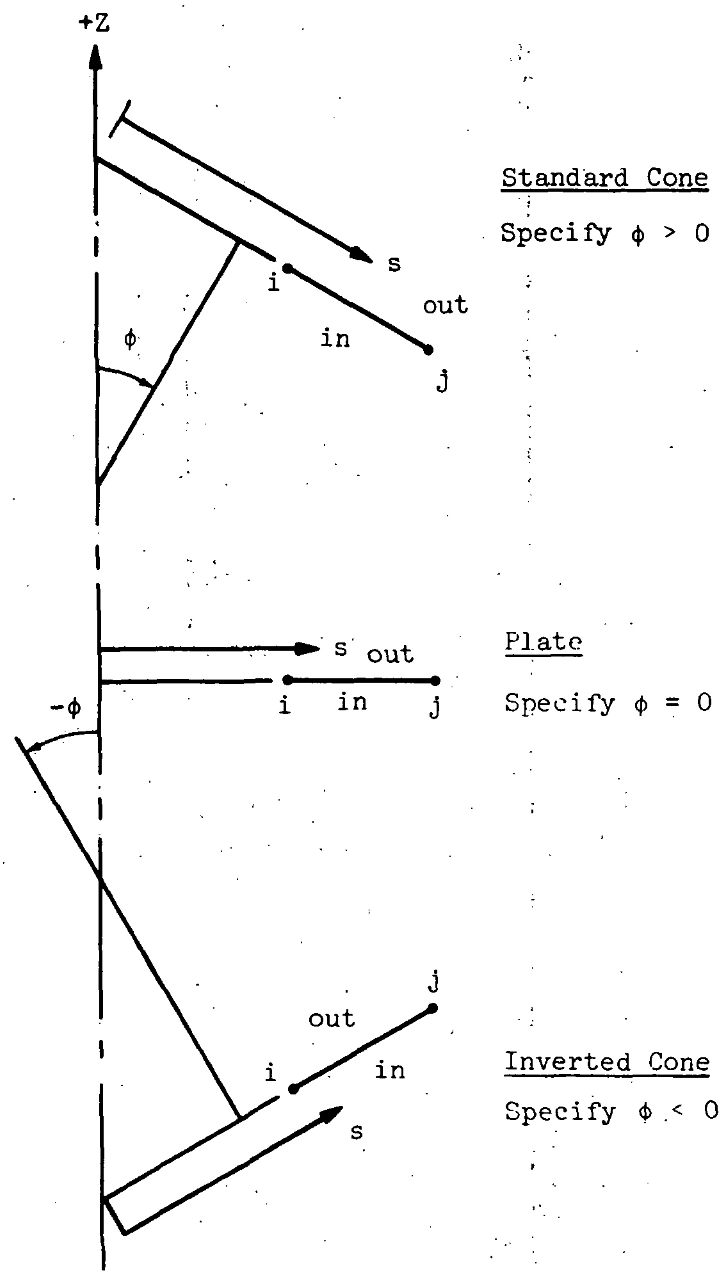


Figure 2-8. Cone

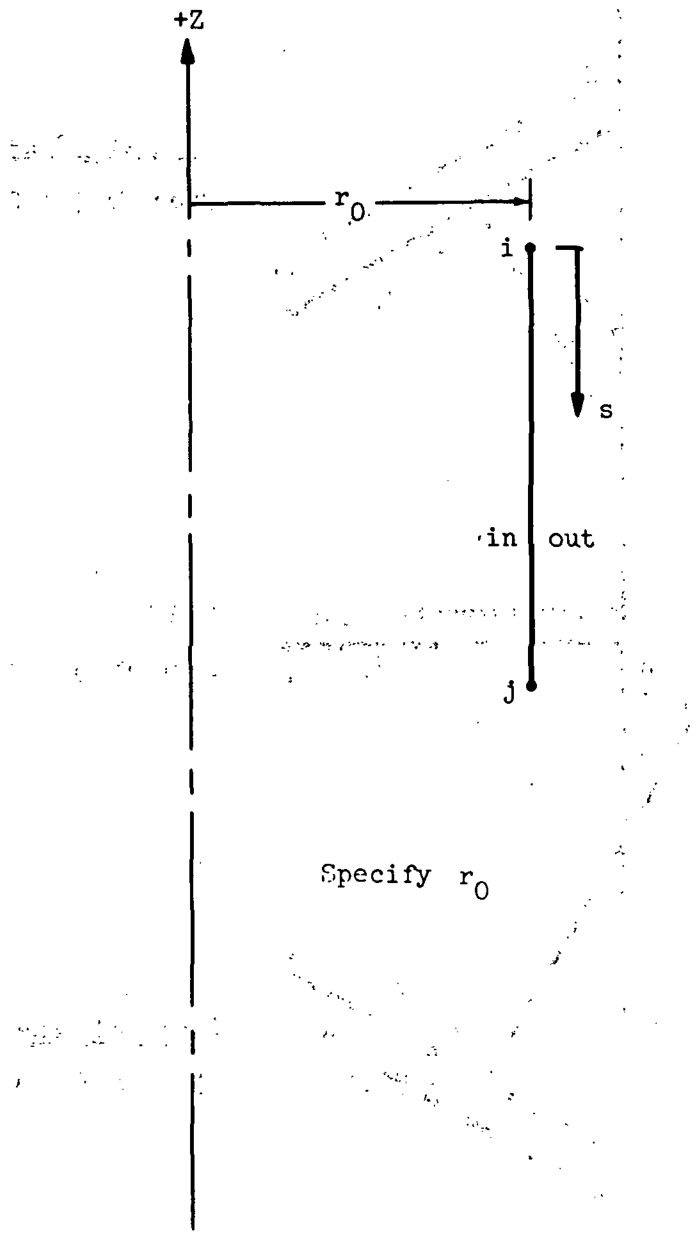


Figure 2-9. Cylinder

SEGMENT CARDS	Column	Format

This sequence of cards is repeated for each segment within the region.

1. Identification Card

   A. Segment identification code (see Figures 2-4 to 2-9)

		Code	Column	Format
1.	Ellipsoidal or spherical shell	Code = 11	1-2	F2.0
2.	Modified ellipse shape	Code = 12	1-2	F2.0
3.	Ogival - Toroidal	Code = 13	1-2	F2.0
4.	General Geometry (see Figure 2-7)	Code = 14A or 14B	1-3	F2.0A1
5.	Dummy geometry slot (ϕ coordinate)	Code = 15	1-2	F2.0
6.	Conical - Circular Plate	Code = 21	1-2	F2.0

   The plate is treated as a cone with zero angle.

		Code	Column	Format
7.	Cylindrical shell	Code = 31	1-2	F2.0

   B. Any alphameric information (segment description) — Column 4-67 — Format 16A4

2. "MAGIC" Control Card

   A. Interval at which final answers are to be printed (in radians or inches). — Column 1-14 — Format E14.1

   The ϕ-coordinate is defined for all geometric shapes except the cylinder, cone and plate, for which the s coordinate is used. Figures 2-4 through 2-9 describe these coordinates for each shape.

   B. Difference — Column 15-28 — Format E14.1

   The value recommended depends upon the computer used. For eight figure accuracy computers it is 1.0 E-6; for the IBM 360 it is 1.0 E-4.

   C. Integration interval — Column 29-42 — Format E14.1

   The Runge Kutta numerical integration procedure is substantially more accurate than finite differencing. An interval of (.01 to.03) x segment size (in radians or inches)is recommended in eigenvalue analysis so as to be able to represent eigenvectors with high wrinkling in the segment interior. (In using a 30 point segment table (see p.2-37)there should be at least 30 integration steps.)

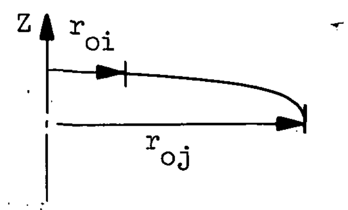
   D. Delta — Column 71-72 — Format F2.0

   For a fixed-step integration, Delta = 0.

   This card controls the Runge-Kutta numerical integration scheme. The suggested values above yield accurate results for a fixed-step integration method.

Calculation of Segment Length

There is a restriction on the length of the shell segments. Physically, the restriction demands that boundary disturbances at one edge be distinctly felt at the other edge. This is a consequence of using a numerical integration procedure. Since the segment stiffness matrices must be symmetric, the calculations involved in obtaining each matrix element must be such that a computer round off error never becomes prominent. Limiting the segment length insures satisfaction of this criterion. This length is a function of both geometric shape and segment location within a specific geometry. One of the limiting factors is that the ratio of the radii of revolution at the initial and final points of a segment be greater than one hundredth and less than one hundred. Thus $\frac{1}{100} < \left(\frac{r_{oi}}{r_{oj}}\right) < 100$ where:



This requires smaller segments than will normally be predicted by formula in the area of an apex. In addition, note that ($\phi = 0$) is not an acceptable input point (except for the torus-ogive or offset ellipsoid).

For a cylinder, the segment length parameter,

$$\Lambda = (1 + \gamma)^{\frac{1}{2}} \beta \Delta s$$

should be held to about 4.0. In this expression, "γ" is a non-linear parameter. For homogeneous shells:

$$\gamma = \left[3(1 - \nu^2)\right]^{\frac{1}{2}} \left(\frac{\bar{N}_\phi r_o}{EH^2}\right)$$

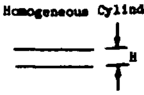
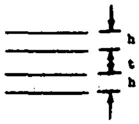
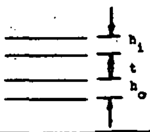
It is zero for a linear problem.

"β" is a measure of the rate of decay of a disturbance in the shell.

"Δs" is the meridional length.

$r_o = r_2 \sin \phi$

The values of β^4 and Δs for various shell geometries are given below:

		For $\nu = 0.3$, $\Lambda \le 4$
Homogeneous Cylinder 	$\beta^4 = \frac{3(1-\nu^2)}{r_0^2 H^2}$	$\Delta s \le \frac{3.11(r_0 H)^{\frac{1}{2}}}{(1+\gamma)^{\frac{1}{4}}}$
Sandwich Cylinder - Equal Face Sheets 	$\beta^4 = \frac{3(1-\nu^2)}{r_0^2(4h^2+6ht+3t^2)}$	$\Delta s \le 3.11\left[r_0^2(4h^2+6ht+3t^2)\right]^{\frac{1}{4}}$
Sandwich Cylinder - Unequal Face Sheets 	$\beta^4 = \frac{3(1-\nu^2)}{(h_i+h_o)^4+12h_ih_ot(h_i+h_o+t)}\left[\frac{h_i+h_o}{r_0}\right]^2$	$\Delta s \le 3.11\left[\frac{r_0}{h_i+h_o}\right]^{\frac{1}{2}}\left[(h_i+h_o)^4+12h_ih_ot(h_i+h_o+t)\right]^{\frac{1}{4}}$

Approximate formulas can be obtained for near cylindrical regions of generally curved surfaces. The length parameter,

$$\Lambda = (1+\gamma)^{\frac{1}{2}}\,\lambda\,\Delta\phi$$

should be held to about 4.0. In this expression "γ" has the same definition as in the cylinder case.

"λ" is a measure of the rate of decay of a disturbance in the shell.

"$\Delta\phi$" $= \frac{\Delta s}{r_1}$ is the angle intercepted by a meridional arc length "Δs".

The values of λ^4 and Δs for various shell geometries are given below:

		For $\nu = 0.3$, $\Lambda \le 4$:
Homogeneous Construction	$\lambda^4 = 3(1-\nu^2)\,\frac{r_1^4}{r_2^2H^2}$	$\Delta s \le \frac{3.11(r_2H)^{\frac{1}{2}}}{(1+\gamma)^{\frac{1}{4}}}$
Sandwich Construction - Equal Face Sheets	$\lambda^4 = \frac{3(1-\nu^2)r_1^4}{r_2^2(4h^2+6ht+3t^2)}$	$\Delta s \le 3.11\left[r_2^2(4h^2+6ht+3t^2)\right]^{\frac{1}{4}}$
Sandwich Construction - Unequal Face Sheets	$\lambda^4 = \frac{3(1-\nu^2)r_1^4}{(h_i+h_o)^4+12h_ih_ot(h_i+h_o+t)}\left[\frac{h_i+h_o}{r_2}\right]^2$	$\Delta s \le 3.11\left[\frac{r_2}{h_i+h_o}\right]^{\frac{1}{2}}\left[(h_i+h_o)^4+12h_ih_ot(h_i+h_o+t)\right]^{\frac{1}{4}}$

The minimum allowable segment length is 1×10^{-3} (inches or radians according to segment sizing).

	Column	Format
3. Geometric Description Card		
A. Ellipsoid and sphere (Figure 2-4)		
1. Semi-axis perpendicular to Z-direction (a)	1-14	E14.1
2. Ratio of semi-axis in the Z-direction (b) to (a), $\beta = \left(\frac{b}{a}\right)$	15-28	E14.1
3. C = offset distance (±) (C = 0.0 if no offset)	29-42	E14.1
B. Modified ellipse shape (Figure 2-5)		
1. Axis ratio coefficient (n)	1-14	E14.1
2. Semi-axis perpendicular to Z-direction (a)	15-28	E14.1
C. Ogive (Figure 2-6)		
1. r_1 = radius	1-14	E14.1
2. C = offset distance (±)	15-28	E14.1
D. General Geometry (Figure 2-7)		
1. Number of pairs of Z versus r_o points (≤ 14)	1-2	I2
2. Z versus r_o points, in pairs, starting with Z value (7 values per card, including first card, for up to 4 cards total). In the input table the first Z value is taken as $Z_1 = 0$, and furthermore $Z_i > 0$ ($i = 2 - 14$) (see Figure 2-7).	3-72 or 1-70	F10.0 or F10.0
E. Cone (Figure 2-8)		
1. Angle ϕ in radians (for flat plate, $\phi = 0$). Keep in mind that this ϕ is a constant for a given cone and should not be confused with the ϕ on the MAGIC Control Card.	1-14	E14.1
F. Cylinder (Figure 2-9)		
1. Radius	1-14	E14.1

4. Master Clue Card

This card contains a series of clues which determine the program and table locations to be used for the segment being described. For a master flow chart of clues and options in the program see Figure 2-1.

	Column	Format
Note: In a two loading condition stability analysis only one condition can involve temperature. Thus the thermal clue on this card refers to that load condition. One load clue card in this case must contain a zero in column 1 (see card set 8).		
A. Material Table Type Clue	1-4	A4
B. Material Title	11-14	A4
C. Sheet Clue	21-24	A4
D. Reinforcement Clue	31-34	A4

Note: In a two loading condition stability analysis only one condition can involve temperature. Thus the thermal clue on this card refers to that load condition. One load clue card in this case must contain a zero in column 1 (see card set 8).

A. Material Table Type Clue — Column 1-4, Format A4

This clue defines the type of material property table to be expected for the segment. This, as well as the following clue determines the material properties that will be used in the structural analysis for the segment. Thus these two clues should match the two clues used on the identification card of the corresponding material property table. As mentioned before on page 2-19, the three possibilities are:

ISOT
ORTH
STIF

B. Material Title — Column 11-14, Format A4

This name should be the same as the name which appears on the material property table which contains the properties to be utilized for this segment.

C. Sheet Clue — Column 21-24, Format A4

This clue informs the program as to what kind of shell wall crossection to expect. If the shell is of single sheet construction, the clue to be used is: SING. If the shell wall is an equal-size face sheet sandwich, the clue to be used is: EQUA. If the shell wall is a sandwich but the face sheets are not equal, the clue to be used is: UNEQ. Finally, if the shell segment is reinforced by rings, stringers, a waffle, or an isogrid, the clue to be used is: BLAN.

D. Reinforcement Clue — Column 31-34, Format A4

This clue describes the type of reinforcement that is present on the shell. If the shell is purely of single sheet or equal or unequal-size face sheet honeycomb construction (no reinforcing), the clue to be used is: THIC. If the reinforcement consists of rings or stringers or both, located along the coordinate axes (θ and ϕ or s), three clues are possible depending upon the basic shell wall construction. If the basic

Column Format

wall construction is a single sheet, the clue to be used is ST11. If the basic shell wall is an equal-size face sheet sandwich, the clue to be used is ST12. If the basic shell wall is a sandwich but the face sheets are unequal, the clue to be used is ST13. If the reinforcement consists of a waffle which is rotated at an arbitrary angle β from the meridional axis the following three clues are possible depending upon the basic shell wall construction. If the basic wall construction is a single sheet, the clue to be used is RWA1. If the basic shell wall is an equal-size face sheet sandwich, the clue to be used is RWA2. If the basic shell wall is a sandwich but the face sheets are unequal, the clue to be used is RWA3. If the reinforcement consists of an isogrid construction of general angle β from the meridional axis (normally $\beta = 30°$) the following three clues are possible depending upon the basic shell wall construction. If the basic wall construction is a single sheet, the clue to be used is ISG1. If the basic shell wall is an equal-size face sheet sandwich, the clue to be used is ISG2. If the basic shell wall is a sandwich but the face sheets are unequal, the clue to be used is ISG3. Two other clues are available, namely ST10 and RWAF, if the user wishes to input his own stiffness constants. These constants may represent any wall construction as long as the basic Hooke's Laws used with the clues are appropriate to describe the construction to be considered. The Hooke's Laws used with these clues are given under the description of segment card set 6.

Note: The reinforcement described in the segment cards is closely spaced reinforcement which will be smeared over the segment. Discrete rings at segment ends in a region are described at the end of all segment data for that region.

E. Thermal Clue — Column 41-44, Format A4

This clue describes the type of thermal problem which exists in the segment. The user is reminded that in a stability run only one of the two possible load cases can be thermal, and this clue pertains to that case. If there is no thermal load on the segment, the clue to be used is NOTH. If the thermal loading on the segment is of general, standard type, that is if there is variation

Column Format

of temperature through the thickness as well as in the coordinate directions, the clue to be used is THST. If the thermal load is such that the variation is all in the coordinate directions, and there is no thermal variation through the thickness, the clue to be used is THCN. The last clue concerns a shell which is inhomogeneous in the meridional direction. This is not really a thermal problem at all, but merely a manipulation of the material property tables. If a structure has a wide variation in material properties in the meridional direction, without this last option one must take short segments of constant properties for analysis. With this option, however, the property variation is placed in the material property table, and expressed on the segment as a function of temperature. No thermal loads are calculated, however, and the temperatures are only used to interpolate for material properties as integration is progressing along the segment. Thus continual variation of properties in the meridional direction is accommodated. The clue for this option is THIN.

F. Stress-free Temperature 51-60 E10.1

The value of the temperature (usually room temperature) at which the segment has no thermal stresses or distortions induced, is provided here. This is the temperature at which the shell was manufactured. If there is to be no thermal analysis, this value is not used and can be set to zero (0.0).

		Column	Format
G.	Table control - Number of points in each of the following tables.	71-72	I2

This can vary from 2 to 30 depending upon the shell geometry and loading. For a linearly varying geometry and/or loading only 2 input points would be required. These two points would be the end points. For more general loading and/or geometry a larger number of points are required. In particular, each abrupt change is specified by two points. One should use as many points as necessary (up to 30) in order to completely describe the problem, rather than using very short segments.

5. Table of ϕ or s Values

A. Initial, intermediate and final values of ϕ or s. Each point requires 14 columns on a card and thus there can be 5 values per card and up to 6 cards to make a total of up to 30 points. The points to be specified are the beginning point of the segment, any point of discontinuity, and the end point of the segment. The input must be consistent with item G of the previous card. — Format: 5E14.7

6. Table of Wall Crossection Geometry

The contents of these cards (up to 6 cards per item below) are dependent upon the clues registered on the Master Clue Card. If the shell to be described contains no reinforcing, the pertinent clue is item 4C, the Sheet Clue. The geometry is input and the stiffnesses are calculated by the program (see Figure 2-10). The input is presented below as a function of the Sheet Clue.

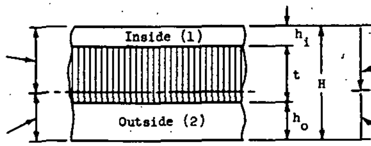
If the Sheet Clue is SING (single sheet construction):

A. Initial, intermediate and final values of wall thickness (h_i) at points defined by table of ϕ or s values. — Format: 5E14.7

$$\bar{\zeta}_{in} = \frac{h_i^2 + h_o^2 + 2h_ih_o + 2h_ot}{2(h_i + h_o)}$$

$$\bar{\zeta}_{out} = \frac{h_i^2 + h_o^2 + 2h_ih_o + 2h_it}{2(h_i + h_o)}$$

E,ν, Constant through thickness



$$\bar{\zeta}_{in} = \frac{E_1h_i^2 + E_2h_o^2 + 2E_2h_oh_i + 2E_2h_ot}{2(E_1h_i + E_2h_o)}$$

$$\bar{\zeta}_{out} = \frac{E_1h_i^2 + E_2h_o^2 + 2E_1h_ih_o + 2E_1h_it}{2(E_1h_i + E_2h_o)}$$

Unequal material properties for the face sheets.
Restriction: properties are such that a neutral plane exists.

Configuration	Extensional Stiffness	Flexural Stiffness	Shear Stiffness
h_i Ortho-tropic	$K_{11} = \frac{E_\theta h_i}{1 - \nu_{\phi\theta}\nu_{\theta\phi}}$ $K_{22} = \frac{E_\phi h_i}{1 - \nu_{\phi\theta}\nu_{\theta\phi}}$	$D_{11} = \frac{E_\theta h_i^3}{12(1 - \nu_{\phi\theta}\nu_{\theta\phi})}$ $D_{22} = \frac{E_\phi h_i^3}{12(1 - \nu_{\phi\theta}\nu_{\theta\phi})}$	$K_{33} = G_{\phi\theta}h_i$ $D_{33} = \frac{G_{\phi\theta}h_i^3}{12}$
h_i t h_i Equal Face Sheets	$K_{11} = \frac{E_{\theta_1}h_i}{1-\nu_{\phi\theta_1}\nu_{\theta\phi_1}} + \frac{E_{\theta_2}h_i}{1-\nu_{\phi\theta_2}\nu_{\theta\phi_2}}$ $K_{22} = \frac{E_{\phi_1}h_i}{1-\nu_{\phi\theta_1}\nu_{\theta\phi_1}} + \frac{E_{\phi_2}h_i}{1-\nu_{\phi\theta_2}\nu_{\theta\phi_2}}$	$D_{11} = \frac{E_{\theta_1}h_i^3}{12(1-\nu_{\phi\theta_1}\nu_{\theta\phi_1})} + \frac{E_{\theta_2}h_i^3}{12(1-\nu_{\phi\theta_2}\nu_{\theta\phi_2})} + h_i\left\{\frac{E_{\theta_1}(\bar{\zeta}_{in}-\frac{h_i}{2})^2}{1-\nu_{\phi\theta_1}\nu_{\theta\phi_1}} + \frac{E_{\theta_2}(\bar{\zeta}_{out}-\frac{h_i}{2})^2}{1-\nu_{\phi\theta_2}\nu_{\theta\phi_2}}\right\}$ $D_{22} = \frac{E_{\phi_1}h_i^3}{12(1-\nu_{\phi\theta_1}\nu_{\theta\phi_1})} + \frac{E_{\phi_2}h_i^3}{12(1-\nu_{\phi\theta_2}\nu_{\theta\phi_2})} + h_i\left\{\frac{E_{\phi_1}(\bar{\zeta}_{in}-\frac{h_i}{2})^2}{1-\nu_{\phi\theta_1}\nu_{\theta\phi_1}} + \frac{E_{\phi_2}(\bar{\zeta}_{out}-\frac{h_i}{2})^2}{1-\nu_{\phi\theta_2}\nu_{\theta\phi_2}}\right\}$	$K_{33} = h_i(G_{\phi\theta_1} + G_{\phi\theta_2})$ $D_{33} = \frac{h_i^3}{12}(G_{\phi\theta_1} + G_{\phi\theta_2}) + h_i\,[G_{\phi\theta_1}(\bar{\zeta}_{in} - \frac{h_i}{2})^2 + G_{\phi\theta_2}(\bar{\zeta}_{ou}$
h_i t h_o Unequal Face Sheets	$K_{11} = \frac{E_{\theta_1}h_i}{1-\nu_{\phi\theta_1}\nu_{\theta\phi_1}} + \frac{E_{\theta_2}h_o}{1-\nu_{\phi\theta_2}\nu_{\theta\phi_2}}$ $K_{22} = \frac{E_{\phi_1}h_i}{1-\nu_{\phi\theta_1}\nu_{\theta\phi_1}} + \frac{E_{\phi_2}h_o}{1-\nu_{\phi\theta_2}\nu_{\theta\phi_2}}$	$D_{11} = \frac{E_{\theta_1}h_i^3}{12(1-\nu_{\phi\theta_1}\nu_{\theta\phi_1})} + \frac{E_{\theta_2}h_o^3}{12(1-\nu_{\phi\theta_2}\nu_{\theta\phi_2})} + \frac{E_{\theta_1}h_i(\bar{\zeta}_{in}-\frac{h_i}{2})^2}{1-\nu_{\phi\theta_1}\nu_{\theta\phi_1}} + \frac{E_{\theta_2}h_o(\bar{\zeta}_{out}-\frac{h_o}{2})^2}{1-\nu_{\phi\theta_2}\nu_{\theta\phi_2}}$ $D_{22} = \frac{E_{\phi_1}h_i^3}{12(1 - \nu_{\phi\theta_1}\nu_{\theta\phi_1})} + \frac{E_{\phi_2}h_o^3}{12(1 - \nu_{\phi\theta_2}\nu_{\theta\phi_2})} + \frac{E_{\phi_1}h_i(\bar{\zeta}_{in}-h_i/2)^2}{1 - \nu_{\phi\theta_1}\nu_{\theta\phi_1}} + \frac{E_{\phi_2}h_o(\bar{\zeta}_{out}-h_o/2)^2}{1 - \nu_{\phi\theta_2}\nu_{\theta\phi_2}}$	$K_{33} = G_{\phi\theta_1}h_i + G_{\phi\theta_2}h_o$ $D_{33} = \frac{G_{\phi\theta_1}h_i^3}{12} + \frac{G_{\phi\theta_2}h_o^3}{12} + G_{\phi\theta_1}h_i(\bar{\zeta}_{in}-\frac{h_i}{2})^2 + G_{\phi\theta_2}h_o(\bar{\zeta}_{out}-\frac{h_o}{2}$

Figure 2-10 Shell Section Properties

	Column	Format
If the Sheet Clue is EQUA (equal-size face sheet sandwich):		
A. Initial, intermediate and final values of face sheet thickness (h_i) at points defined by table of ϕ or s values.		5E14.7
B. Initial, intermediate and final values of core thickness (t) at points defined by table of ϕ or s values.		5E14.7
If the Sheet Clue is UNEQ (unequal-size face sheet sandwich):		
A. Initial, intermediate and final values of <u>inner</u> face sheet thickness (h_i) at points defined by table of ϕ or s values.		5E14.7
B. Initial, intermediate and final values of core thickness (t) at points defined by table of ϕ or s values.		5E14.7
C. Initial, intermediate and final values of <u>outer</u> face sheet thickness (h_o) at points defined by table of ϕ or s values.		5E14.7

If the shell is reinforced, the Sheet Clue will be BLAN. In this case it is the following, or Reinforcement Clue (item 4D) which will determine the contents of card series 6. For the reinforcement cases the geometry can be complex and varied, since all types of reinforcing are to be included. The reinforced shell input is presented below as a function of the Reinforcement Clue.

	Column	Format
If the Reinforcement Clue is ST11 (single sheet reinforced by rings and/or stringers):		
A. Initial, intermediate and final values of the torsional stiffness in the ϕ direction (GJ_ϕ) at points defined by table of ϕ or s values.		5E14.7
B. Initial, intermediate and final values of the torsional stiffness in the θ direction (GJ_θ) at points defined by table of ϕ or s values.		5E14.7
C. Initial, intermediate and final values of stringer area (A_ϕ) at points defined by table of ϕ or s values.		5E14.7
D. Initial, intermediate and final values of ring area (A_θ) at points defined by table of ϕ or s values.		5E14.7
E. Initial, intermediate and final values of stringer eccentricity (measured inwards from base shell centroid as positive) at points defined by table of ϕ or s values.		5E14.7

	Column	Format
F. Initial, intermediate and final values of ring eccentricity (measured inwards from base shell centroid as positive) at points defined by table of ϕ or s values.		5E14.7
G. Initial, intermediate and final values of stringer moment of inertia (about base shell centroidal axis) at points defined by table of ϕ or s values.		5E14.7
H. Initial, intermediate and final values of ring moment of inertia (about base shell centroidal axis) at points defined by table of ϕ or s values.		5E14.7
I. Initial, intermediate and final values of stringer spacing at points defined by table of ϕ or s values. (Do not set to zero if no stringers.)		5E14.7
J. Initial, intermediate and final values of ring spacing at points defined by table of ϕ or s values. (Do not set to zero if no rings.)		5E14.7
K. Initial, intermediate and final values of base shell wall thickness (h_i) at points defined by table of ϕ or s values.		5E14.7

If the Reinforcement Clue is ST12 (equal face sheet sandwich reinforced by rings and/or stringers):

	Column	Format
A. through J. The items contained on these cards are those described for the ST11 clue above.	10 sets of	5E14.7
K. Initial, intermediate and final values of base shell face sheet thickness (h_i) at points defined by table of ϕ or s values.		5E14.7
L. Initial, intermediate and final values of base shell core thickness (t) at points defined by table of ϕ or s values.		5E14.7

If the Reinforcement Clue is ST13 (unequal face sheet sandwich reinforced by rings and/or stringers):

	Column	Format
A. through J. The items contained on these cards are those described for the ST11 clue above.	10 sets of	5E14.7
K. Initial, intermediate and final values of base shell inner face sheet thickness (h_i) at points defined by table of ϕ or s values.		5E14.7
L. Initial, intermediate and final values of base shell core thickness (t) at points defined by table of ϕ or s values.		5E14.7

	Column	Format
M. Initial, intermediate and final values of base shell <u>outer</u> face sheet thickness (h_o) at points defined by table of ϕ or s values.		5E14.7

If the Reinforcement Clue is RWA1 (single sheet reinforced by a waffle rotated at an arbitrary angle from the meridional direction):

	Column	Format
A. Initial, intermediate and final values of waffle grid area at points defined by table of ϕ or s values.		5E14.7
B. Initial, intermediate and final values of waffle grid eccentricity (measured inwards from base shell centroid as positive) at points defined by table of ϕ or s values.		5E14.7
C. Initial, intermediate and final values of waffle grid moment of inertia (about base shell centroidal axis) at points defined by table of ϕ or s values.		5E14.7
D. Initial, intermediate and final values of waffle grid spacing at points defined by table of ϕ or s values.		5E14.7
E. Initial, intermediate and final values of waffle grid rotation angle, β, (in radians from the meridional direction) at points defined by table of ϕ or s values.		5E14.7
F. Initial, intermediate and final values of extreme distance from base shell centroid to waffle outer edge (± value, positive inwards), at points defined by table of φ or s values.		5E14.7
G. Initial, intermediate and final values of base shell wall thickness (h_i) at points defined by table of ϕ or s values.		5E14.7

If the Reinforcing Clue is RWA2 (equal face sheet sandwich reinforced by a waffle rotated at an arbitrary angle from the meridional direction):

	Column	Format
A. through F. The items contained on these cards are those described for the RWA1 clue above.	6 sets of	5E14.7
G. and H. The items contained on these cards are those described for the ST12 clue above as items K. and L.	2 sets of	5E14.7

If the Reinforcing Clue is RWA3 (unequal face sheet sandwich reinforced by a waffle rotated at an arbitrary angle from the meridional direction):

	Column	Format
A. through F. The items contained on these cards are those described for the RWA1 clue above.	6 sets of	5E14.7
G. through I. The items contained on these cards are those described for the ST13 clue above as items K. through M.	3 sets of	5E14.7

	Column	Format
If the Reinforcing Clue is ISG1 (single sheet *reinforced by a general angle isogrid construction*):		
A. through D. The items contained on these cards are identical to those described for the RWA1 clue above, but with reference to the isogrid.	4 sets of	5E14.7
E. Initial, intermediate and final values of the isogrid angle, β, (in radians from the meridional direction, see Reference 1 Appendix A). For the normal isogrid, the angle is 30° (input in radians).		5E14.7
F. Initial, intermediate and final values of base shell wall thickness (h_i) at points defined by table of ϕ or s values.[1]		5E14.7
If the Reinforcing Clue is ISG2 (equal face sheet sandwich reinforced by a general angle isogrid construction):		
A. through E. The items contained on these cards are those described for the ISG1 clue above.	5 sets of	5E14.7
F. and G. The items contained on these cards are those described for the ST12 clue above as items K. and L.	2 sets of	5E14.7
If the Reinforcing Clue is ISG3 (unequal face sheet sandwich reinforced by a general angle isogrid construction):		
A. through E. The items contained on these cards are those described for the ISG1 clue above.	5 sets of	5E14.7
F. through H. The items contained on these cards are those described for the ST13 clue above as items K. through M.	3 sets of	5E14.7

If the Reinforcing Clue is ST10 the following Hooke's Laws will be used by the program for the description of the shell wall:

$$N_\theta = K_{11}\varepsilon_{\theta_o} + K_{12}\varepsilon_{\phi_o} - C_{11}k_\theta - N_{T\theta}$$

$$N_\phi = K_{22}\varepsilon_{\phi_o} + K_{12}\varepsilon_{\theta_o} - C_{22}k_\phi - N_{T\phi}$$

$$N_{\phi\theta} = N_{\theta\phi} = K_{33}\,\gamma_{\phi\theta_o}$$

	Column	Format

$$M_\theta = D_{11}k_\theta + D_{12}k_\phi + C_{11}\varepsilon_{\theta_o} - M_{T\theta}$$

$$M_\phi = D_{22}k_\phi + D_{12}k_\theta + C_{22}\varepsilon_{\phi_o} - M_{T\phi}$$

$$M_{\phi\theta} = -M_{\theta\phi} = -2D_{33}k_{\phi\theta}$$

Therefore the input is (see Ref. 1 Appendix A):

		Format
A.	Initial, intermediate and final values of K_{11} at points defined by table of ϕ or s values.	5E14.7
B.	Initial, intermediate and final values of K_{12} at points defined by table of ϕ or s values.	5E14.7
C.	Initial, intermediate and final values of K_{22} at points defined by table of ϕ or s values.	5E14.7
D.	Initial, intermediate and final values of K_{33} at points defined by table of ϕ or s values.	5E14.7
E.	Initial, intermediate and final values of D_{11} at points defined by table of ϕ or s values. (Should be input as <u>negative</u> for sign convention.)	5E14.7
F.	Initial, intermediate and final values of D_{12} at points defined by table of ϕ or s values. (Should be input as <u>negative</u> for sign convention.)	5E14.7
G.	Initial, intermediate and final values of D_{22} at points defined by table of ϕ or s values. (Should be input as <u>negative</u> for sign convention.)	5E14.7
H.	Initial, intermediate and final values of D_{33} at points defined by table of ϕ or s values.	5E14.7
I.	Initial, intermediate and final values of C_{11} at points defined by table of ϕ or s values.	5E14.7
J.	Initial, intermediate and final values of C_{22} at points defined by table of ϕ or s values.	5E14.7

If the Reinforcing Clue is RWAF the following Hooke's Laws will be used by the program for the description of the shell wall:

$$N_\theta = K_{11}\,\varepsilon_{\theta_o} + K_{12}\,\varepsilon_{\phi_o} - C_{11}\,k_\theta - C_{15}\,k_\phi - N_{T\theta}$$

$$N_\phi = K_{22}\,\varepsilon_{\phi_o} + K_{12}\,\varepsilon_{\theta_o} - C_{15}\,k_\theta - C_{22}\,k_\phi - N_{T\phi}$$

$$N_{\phi\theta} = K_{33}\,\gamma_{\phi\theta_o} - 2C_{16}\,k_{\phi\theta}$$

	Column	Format

$$M_\theta = D_{11} k_\theta + D_{12} k_\phi + C_{11} \varepsilon_{\theta_o} + C_{15} \varepsilon_{\phi_o} - M_{T\theta}$$

$$M_\phi = D_{22} k_\phi + D_{12} k_\theta + C_{15} \varepsilon_{\theta_o} + C_{22} \varepsilon_{\phi_o} - M_{T\phi}$$

$$M_{\phi\theta} = -2D_{33} k_{\phi\theta} + C_{16} \gamma_{\phi\theta_o}$$

Therefore the input is (see Ref. 1 Appendix A):

Item	Column	Format
A. through J. The items contained on these cards are those described for the ST10 clue above.	10 sets of	5E14.7
K. Initial, intermediate and final values of C_{15} at points defined by table of ϕ or s values.		5E14.7
L. Initial, intermediate and final values of C_{16} at points defined by table of ϕ or s values.		5E14.7

7. Table of Input Stress Resultants (Stability Only)

This card set is included only if the Prestress Input Clue (Item I page 2-15) is set to unity.

Item	Column	Format
A. Initial, intermediate and final values of the hoop stress resultant, N_θ, at points defined by table of φ or s values.		5E14.7
B. Initial, intermediate and final values of the meridional stress resultant, N_φ, at points defined by table of φ or s values.		5E14.7

If the number of loading conditions (item G page 2-14) is set to two, then the above two card sets A and B refer to the first (fixed magnitude) load condition. They should be then followed by two more card sets, C and D, identifying the assumed N_θ, and N_φ respectively, for the second (eigen-value) load condition. Do not use normalized values for buckling load or stress resultant assumptions since the program equations are not normalized, and thus such values will be too small for proper calculations.

7. Table of Mass Densities (Vibrations Only)
Dimensions = weight/volume/acceleration due to gravity.

The contents of these cards (up to 6 cards per item below) are dependent upon the clues registered on the Master Clue Card. If the shell to be described contains no reinforcing, the pertinent clue is item 4C, the sheet clue. The input is presented below as a function of the Sheet Clue.

	Column	Format
If the Sheet Clue is SING (single sheet construction):		
A. Initial, intermediate and final values of the wall mass density at points defined by table of φ or s values.		5E14.7
If the Sheet Clue is EQUA or UNEQ (sandwich construction):		
A. Initial, intermediate and final values of the core mass density at points defined by table of φ or s values.		5E14.7
B. Initial, intermediate and final values of the face sheet mass density at points defined by table of φ or s values.		5E14.7
If the shell is reinforced, the Sheet Clue will be BLAN. In this case it is the following, or Reinforcement Clue (item 4D) which will determine the contents of card series 7. The reinforced shell input is presented below as a function of the Reinforcement Clue.		
If the Reinforcement Clue is ST11 (single sheet reinforced by rings and/or stringers):		
A. Initial, intermediate and final values of the base shell mass density at points defined by table of φ or s values.		5E14.7
B. Initial, intermediate and final values of the stringer mass density at points defined by table of φ or s values.		5E14.7
C. Initial, intermediate and final values of the ring mass density at points defined by table of φ or s values.		5E14.7
If the Reinforcement Clue is ST12 or ST13 (sandwich reinforced by rings and/or stringers):		
A. Initial, intermediate and final values of the base shell core mass density at points defined by table of φ or s values.		5E14.7
B. Initial, intermediate and final values of the base shell face sheet mass density at points defined by table of φ or s values.		5E14.7
C. and D. The items contained on these cards are those described for the ST11 clue as items B. and C.	2 sets of	5E14.7

	Column	Format
If the Reinforcement Clue is RWA1 or ISG1 (single sheet reinforced by a rotated waffle or isogrid):		
A. Initial, intermediate and final values of the base shell mass density at points defined by table of φ or s values.		5E14.7
B. Initial, intermediate and final values of the reinforcement mass density at points defined by table of φ or s values.		5E14.7
If the Reinforcement Clue is RWA2, RWA3, ISG2 or ISG3 (sandwich reinforced by a rotated waffle or isogrid):		
A. Initial, intermediate and final values of the base shell core mass density at points defined by table of φ or s values.		5E14.7
B. Initial, intermediate and final values of the base shell face sheet mass density at points defined by table of φ or s values.		5E14.7
C. Initial, intermediate and final values of the reinforcement mass density at points defined by table of φ or s values.		5E14.7
If the Reinforcing Clue is ST10 or RWAF the program does not have any crossection description available to it for calculations. Thus the required input in card set 7 for these clues is (see Refs. 1 and 5):		
A. The meridional distributed load on the crossection due to rotation at points defined by table of φ or s values. For example for a layered section this can be expressed as: $$f^1_\varphi = \sum_{i=1}^{n} \rho_i \omega^2 r_i t_i \cos\varphi$$		5E14.7
B. The normal distributed load on the crossection due to rotation at points defined by table of φ or s values. For example for a layered section this can be expressed as: $$f^1_\zeta = -\sum_{i=1}^{n} \rho_i \omega^2 r_i t_i \sin\varphi$$		5E14.7

	Column	Format
C. The circumferential distributed moment load on the crossection due to rotation at points defined by table of φ or s values. For example for a layered section this can be expressed as:		5E14.7

$$m_\theta = - \sum_{i=1}^{n} \rho_i \omega^2 r_i t_i \bar{y}_i \cos \varphi$$

Note: The sign convention for the above loads is as shown in Figures 2-11.

D. The crossection parameter a_0 at points defined by table of φ or s values.		5E14.7
E. The crossection parameter a_1 at points defined by table of φ or s values.		5E14.7
F. The crossection parameter a_2 at points defined by table of φ or s values.		5E14.7

The crossection parameters a_j can be defined as follows:

$$a_j = \int_{\text{thickness}} \rho \zeta^{(j)} d\zeta \qquad , j = 0,1,2$$

where ζ is measured from the centroid (inwards positive).

8. Loading Clue Card (These cards and card sequence 9 are omitted under the following conditions:

Stability - if the prestress input clue (item I page 2- 15) is unity.

Vibrations - if the Dynamic Analysis description clue (item A page 2- 18) is FREV, CRSP or CRSR.)

The contents of this card are numerical clues which alert the program to the types of loads that exist on the segment. In addition, if the clue indicates that some load does not exist, the appropriate cards in series 9 which would ordinarily contain the numerical values of this load are omitted from the sequence.

	Column	Format
The series of cards 8 and 9 are repeated for the number of loading conditions indicated on the Program Control Card (item G) up to a maximum of 2 (except in Vibrations - see below). If for one of these loading conditions, no load exists on the segment, then a blank Loading Clue Card is inserted in the sequence at this point and the load cards are entirely omitted (see Ref. 6).		
Only in a stability analysis can there possibly be two sets of cards 8 and 9. In vibrations analysis with Dynamic analysis description clues of VPRE, PCRS or PCSR only the prestress load state is described here, the dynamic loads being calculated internally by the program.		
The appropriate clues are as follows:		
A. Thermal Clue	1	I1
If there are no thermal loads (Item 4E is NOTH) the clue number is zero (0).		
If there is a standard thermal variation through the thickness (Item 4E is THST) the clue number is four (4).		
If the temperature is constant through the thickness (Item 4E is THCN) or if the inhomogeneous option is used (Item 4E is THIN) the clue number is one (1).		
In a stability analysis only one loading condition can contain temperature. Thus in the case of two load conditions on the shell the above item must be zero on one of the clue cards		
B. Enter a zero (0) in column 2.	2	I1
C. Meridional Load Clue (f_ϕ)	3	I1
If there are <u>no</u> meridional loads, then the clue number is zero (0).		
If there are meridional loads, then the clue number is one (1).		
D. Normal Load Clue (f_ζ)	4	I1
If there are <u>no</u> normal loads, then the clue number is zero (0).		
If there are normal loads, then the clue number is one (1).		

		Column	Format
E.	Circumferential Moment Load Clue (m_θ)	5	I1
	If there are <u>no</u> circumferential moment loads, then the clue number is zero (0).		
	If there are circumferential moment loads, then the clue number is one (1).		
F.	Enter a zero (0) in column 6	6	I1
G.	Any alphameric information (load description)	7-70	16A4

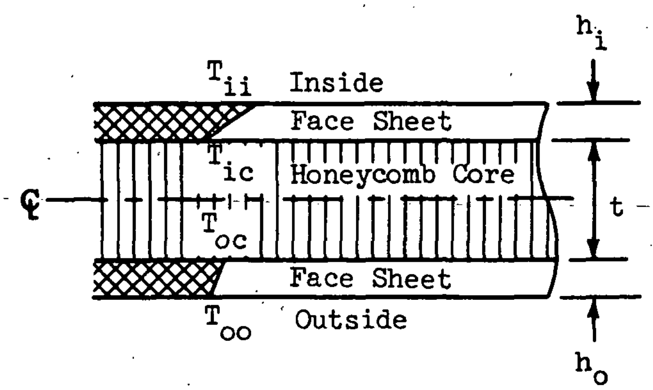
9. Table of Applied Loads (see Figures 2-11a, b for sign convention).

The appropriate card sequence is given below as a function of the Loading Clues on card 8. If the Thermal Clue is one (1):

A. Initial, intermediate and final values of the temperature of the shell at points defined by table of ϕ or s values. (These values will be used either for a thermal problem where there is no thermal variation through the thickness {Clue = THCN}, or to calculate varying material properties along the shell for an inhomogeneous problem {Clue = THIN}.) — 5E14.7

If the Thermal Clue is four (4):

A. Initial, intermediate and final values of the temperature T_{ii} at points defined by table of ϕ or s values. (The subscripts "nm" indicate temperature location - see below.) — 5E14.7



	Column	Format

B. Initial, intermediate and final values of the temperature T_{ic} at points defined by table of ϕ or s values. — 5E14.7

C. Initial, intermediate and final values of the temperature T_{oc} at points defined by table of ϕ or s values. — 5E14.7

D. Initial, intermediate and final values of the temperature T_{oo} at points defined by table of ϕ or s values. — 5E14.7

If the Thermal Clue is zero (0), the above cards are omitted.

If the Meridional Load Clue is one (1):

E. Initial, intermediate and final values of the meridional loads f_{ϕ} at points defined by table of ϕ or s values. — 5E14.7

If the Meridional Load Clue is zero (0), cards E are omitted.

If the Normal Load Clue is one (1):

F. Initial, intermediate and final values of the normal loads f_{ζ} at points defined by table of ϕ or s values. — 5E14.7

If the Normal Load Clue is zero (0), cards F are omitted.

If the Circumferential Moment Load Clue is one (1):

G. Initial, intermediate and final values of the circumferential moment loads m_{θ} at points defined by table of ϕ or s values. — 5E14.7

If the Circumferential Moment Load Clue is zero (0), cards G are omitted.

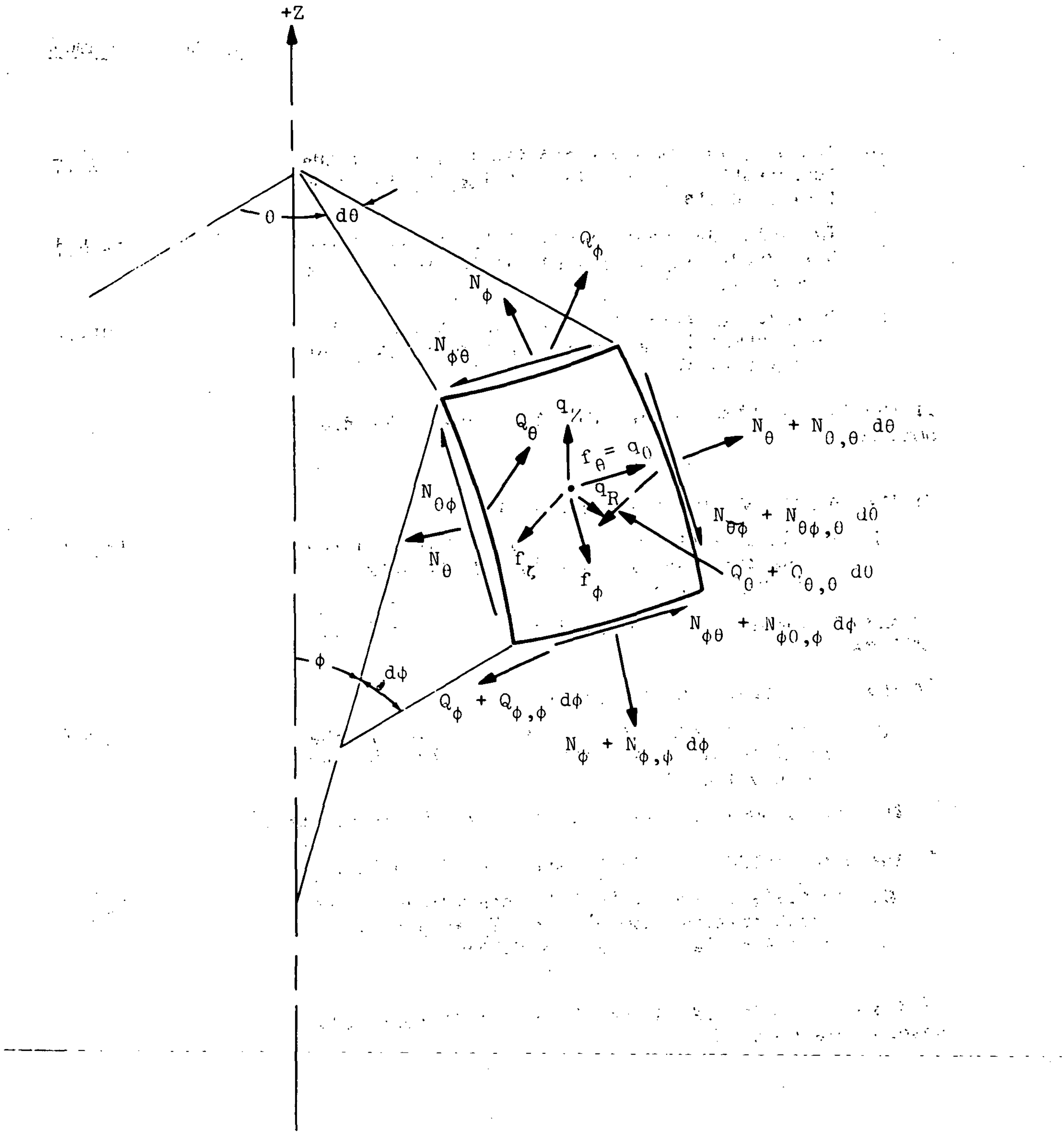


Figure 2-11a. Forces on Shell Element

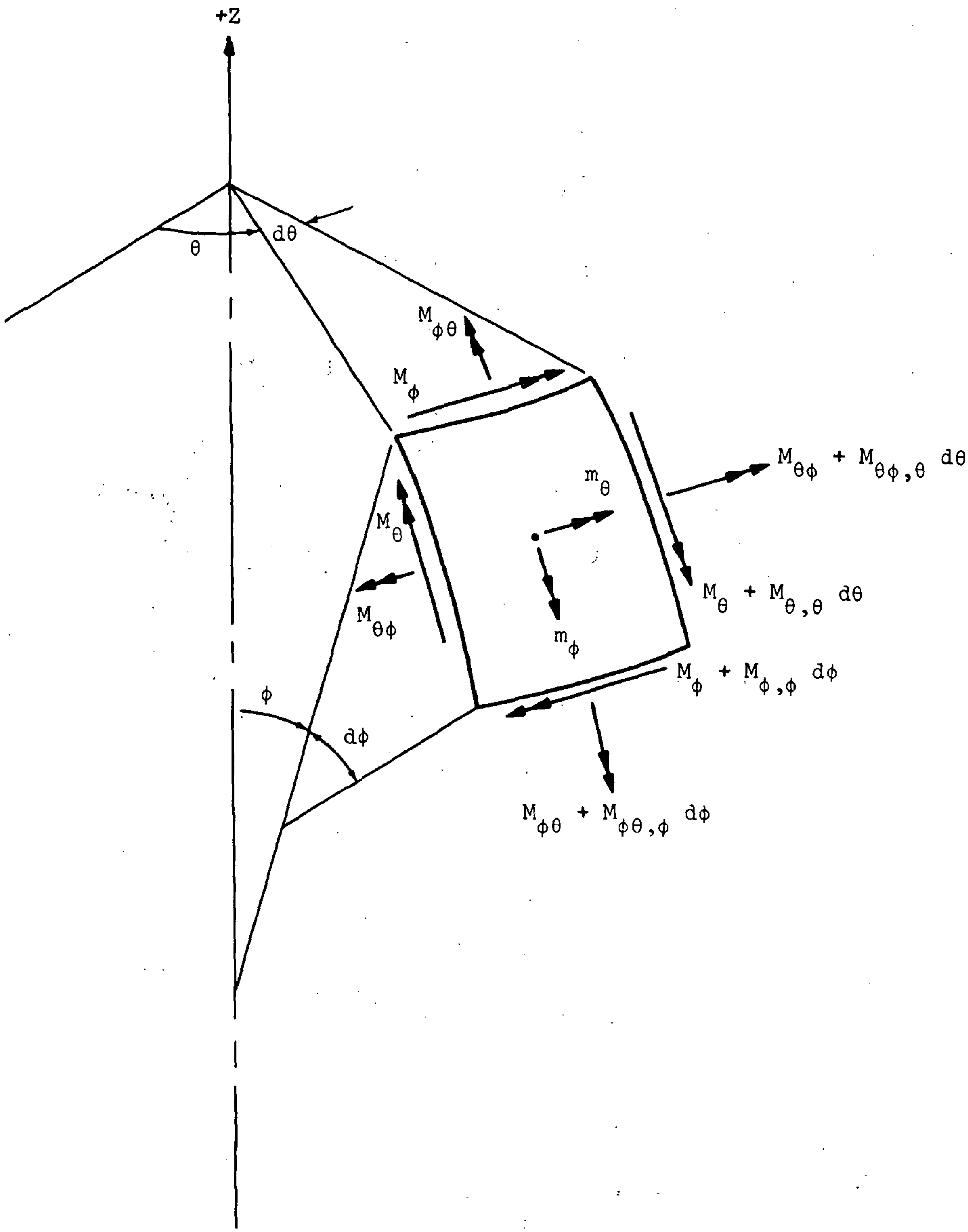


Figure 2-11b. Moments on Shell Element

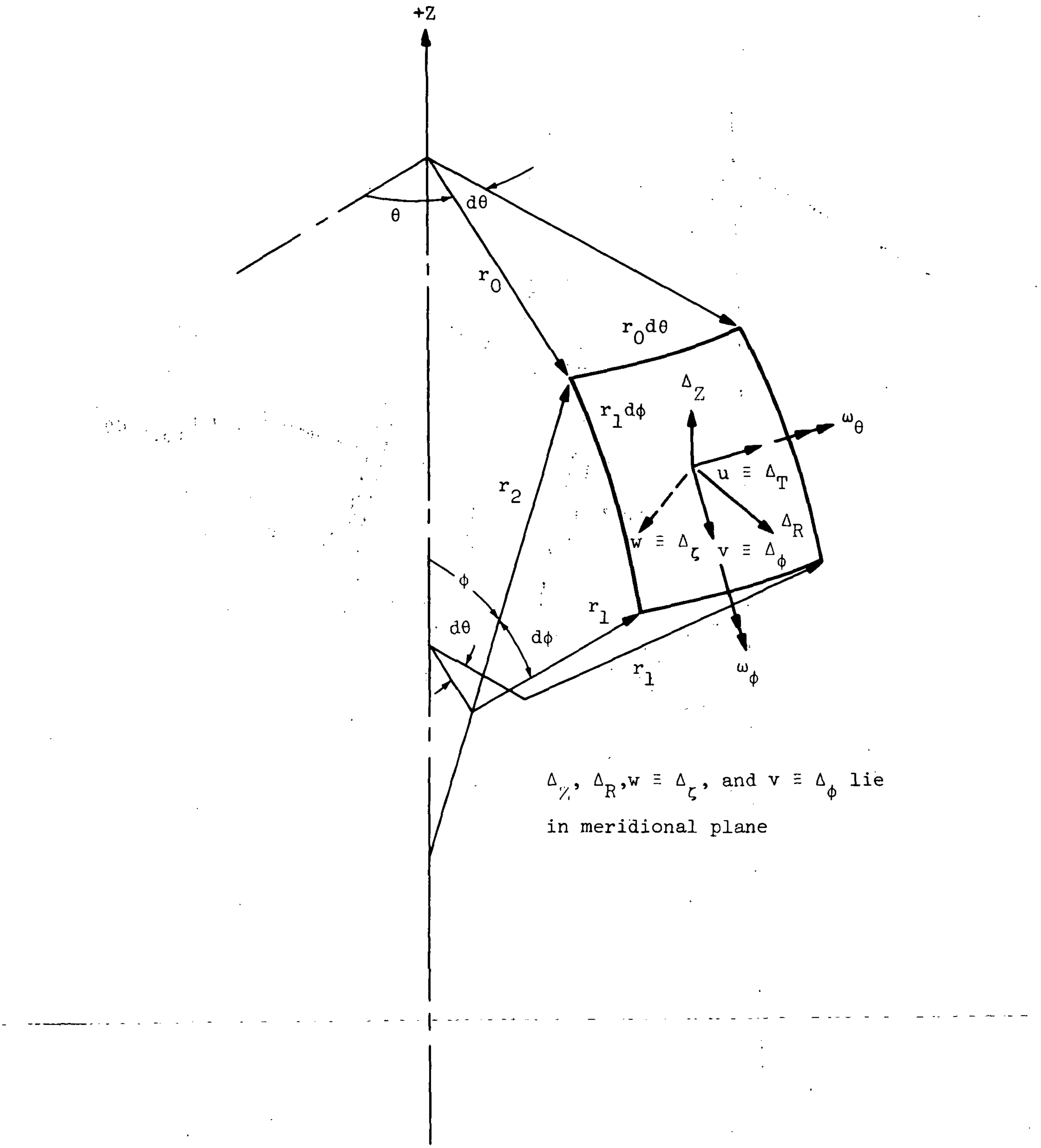


Figure 2-11c. Shell Element Geometry and Displacements

		Column	Format
10.	Segment Topology Cards		
	A. Segment number Number of the segment under consideration.	1-5	I5
	B. Joint (i) Joint associated with i^{th} end of the segment (TIC).	6-10	I5
	C. Joint (j) Joint associated with the j^{th} end of the segment (STOP).	11-15	I5

Since within a region the segments are all singly connected, the segment joint numbers should be in adjacent numerical pairs. That is, if joint (j) is 6, joint (i) could only be 5 or 7. This is true only within a region.

In addition, the initial joint of each region must be 1 in segment topology numbering, and, the final joint of each region must be the last (highest) number in the segment topology numbering (see Figure 2-12). The coordinate ϕ or s increases from TIC to STOP, i to j. The user is again advised to see Figures 2-3 to 2-9.

D-A-S-H S-E-P-A-R-A-T-O-R C-A-R-D (See General Notes - Data Debugging) — minus in 1-80

INTRA-REGION DISCRETE RING CARDS

These cards, if any exist (region introductory card, item 1C), are placed at the end of all the segment data for the region. They contain the following information for each ring (in groups of 4 cards):

		Column	Format
1.	Ring Location and Property Card		
	A. Segment joint number to which the ring is attached. If there is also a radial discontinuity at this location necessitating a kinematic link, the joint number of the ring is the independent joint number of the link (see Figure 2-13a).	1-2	I2

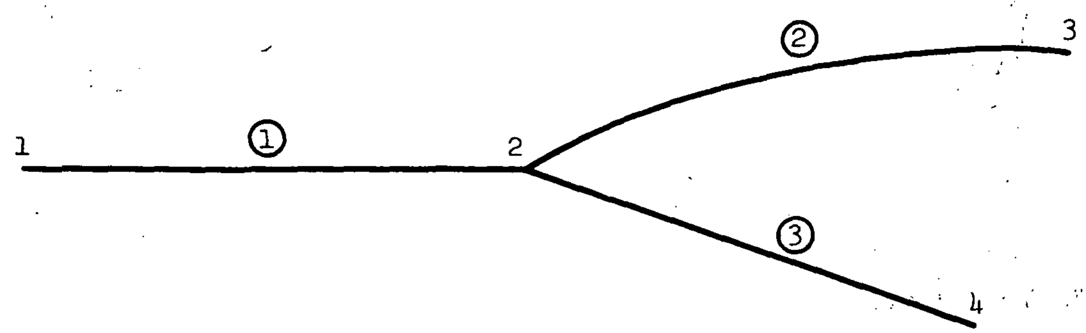
		Column	Format
B.	Ring extensional stiffness (EA)	3-16	E14.7
C.	Ring bending stiffness about centroidal y axis (EI_y). See Figure 2-14.	17-30	E14.7
D.	Ring cross-bending stiffness about centroidal axes (EI_{xy}).	31-44	E14.7
E.	Ring torsional stiffness (GJ)	45-58	E14.7
F.	Ring bending stiffness about centroidal x axis (EI_x).	59-72	E14.7

2. Ring Geometry Card (see Figure 2-14)

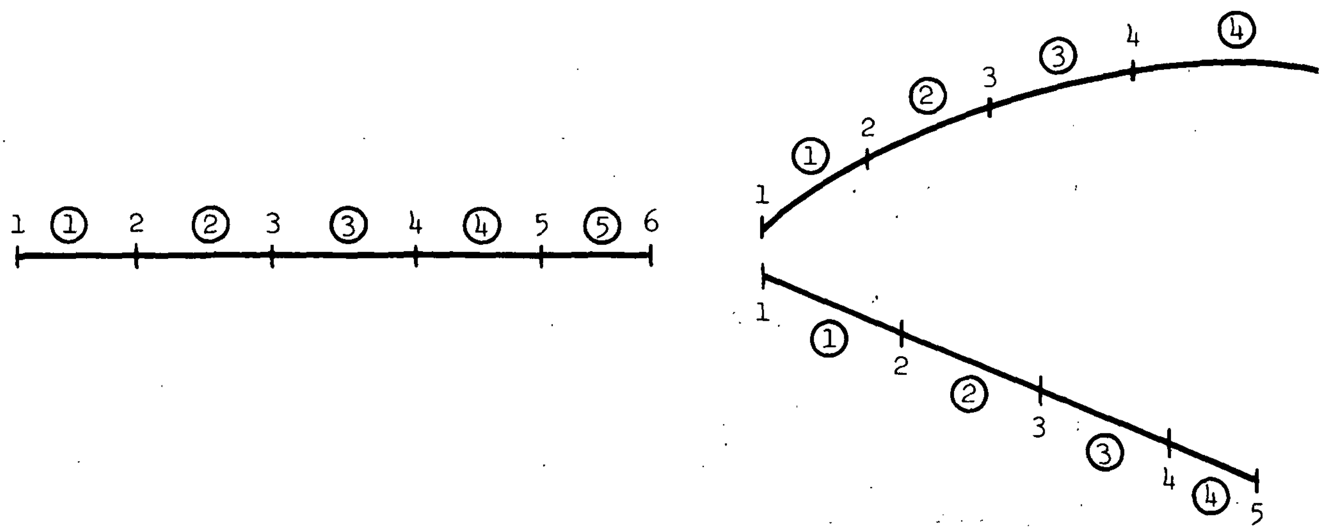
		Column	Format
A.	Ring thermal coefficient of expansion (α_R).	1-12	E12.5
B.	Ring centroidal radius (r_c).	13-24	E12.5
C.	Distance (±) between ring centroid and shear center in the x direction (x_c).	25-36	E12.5
D.	Distance (±) between ring centroid and shear center in the y direction (y_c).	37-48	E12.5
E.	Offset (±) of ring shear center from attached shell joint (see item 1A) in the x direction ($\bar{x}$).	49-60	E12.5
F.	Offset (±) of ring shear center from attached shell joint (see item 1A) in the y direction ($\bar{y}$). Note: The shear center (S) is the origin of the x, y axes shown in Figure 2-14.	61-72	E12.5

3. Ring Thermal Description Card (See Figure 2-14)

		Column	Format
A.	Distance (±) between ring shear center and the closest (innermost) radially measured ring point x_I (in x = radial direction).	1-14	E14.7
B.	Distance (±) between ring shear center and the farthest (outermost) radially measured ring point, x_O (in x = radial direction). Note: Items A & B cannot both be input as zero.	15-28	E14.7

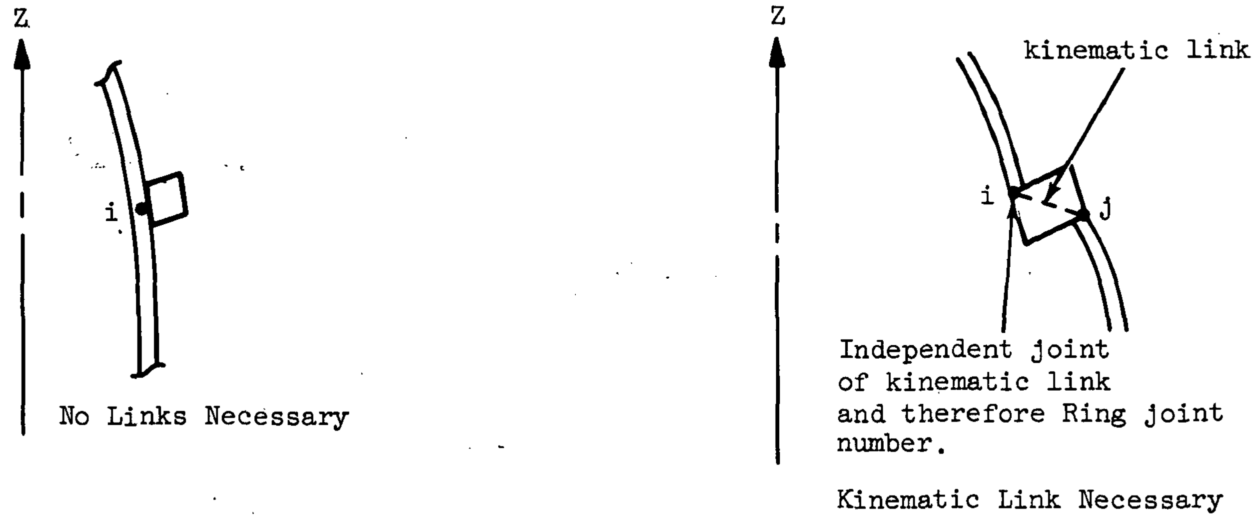


Region Numbering

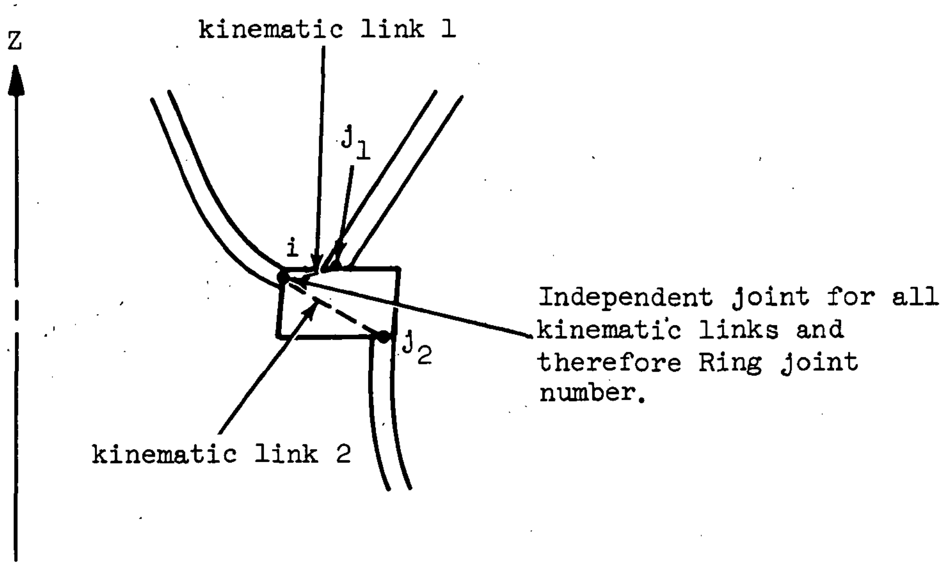


Numbering of Segments Within Regions

Figure 2-12. Topology Schemes



(a) Segment or Simple Region Rings



(b) Possible Region Multi-connected Rings

Figure 2-13. Discrete Ring Topology

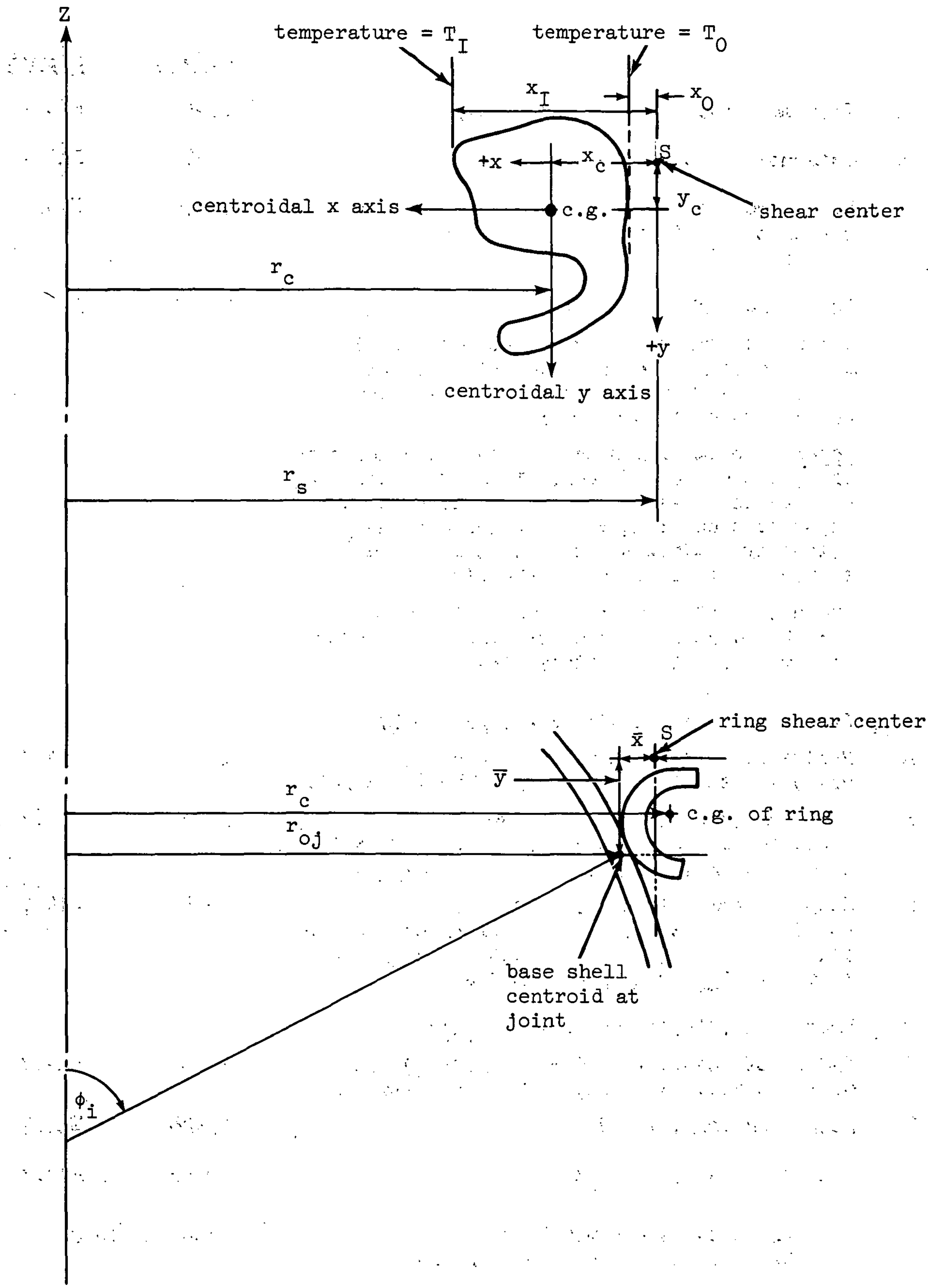


Figure 2-14. Discrete Ring Geometry

		Column	Format
C.	Innermost point temeperature (T_I)	29-42	E14.7
D.	Outermost point temperature (T_0)	43-56	E14.7
E.	Ring stress-free temperature (room or manufacturing temperature (see Note for Master Clue Card item F).	57-70	E14.7
F.	Load Case Number (Stability analysis only)	71-72	I2

Enter the load case number (either 1 or 2) which contains the above described thermal load. This should be consistent with the segment thermal load order.

Note: Thermal loads on the rings are input on the above cards. Mechanical loads on the ring must be input as a load distribution on the segments connecting to the ring. A higher intensity loading may be distributed near the segment ends connected to the ring.

The number of sets of discrete ring cards must be equal the number specified in item 1C, of the region introductory card.

4. Ring Prestress Card (Stability analysis only)

		Column	Format
A.	Radius of revolution at the segment joint which is used to identify the ring (Item 1A).	1-14	E14.7
B.	Hoop prestress in the ring due to load condition 1. (Enter only if the prestress input clue, item I page 2-15, is set to unity.)	15-28	E14.7
C.	Hoop prestress in the ring due to load condition 2. (Enter only if the prestress input clue, item I page 2-15, is set to unity, and there are two loading conditions.)	29-42	E14.7

4. Ring Mass Card (Vibrations analysis only)

		Column	Format
A.	Radius of revolution at the segment joint which is used to identify the ring (item 1A).	1-14	E14.7
B.	Ring mass density (ρ)	15-28	E14.7
C.	Ring Young's Modulus (E)	29-42	E14.7

D-A-S-H S-E-P-A-R-A-T-O-R C-A-R-D (See General Notes - Data Debugging) — minus in 1-80

	Column	Format
INTRA-REGION KINEMATIC LINK CARDS		
These cards, if any exist (region introductory card, item 1B), are placed at the end of all the discrete ring data for the region. They contain the following information:		
A. Joint (j) dependent joint	1-2	I2
B. Joint (i) independent joint	3-4	I2
For intra-region kinematic links these joints must be in consecutive decending order. That is, joint (j) should always be greater than joint (i) by one.		
C. Angle γ in radians (see Figure 2-15)	5-19	E14.7
γ cannot equal 0 or π.		
The angle γ describes the orientation of the link; it is the inclination angle of the link from the vertical (Z axis).		
The number of kinematic link cards must equal the number specified in item 1B, of the region introductory card.		
D-A-S-H S-E-P-A-R-A-T-O-R C-A-R-D (See General Notes - Data Debugging)		minus in 1-80
REGION JOINT CONTROL DATA		
These cards are placed at the end of all the data for all regions.		
1. Joint Control Data Card		
A. Number of region joints	1-5	I5
Total number of region joints (Max. = 30).		
B. Number of discrete rings	6-10	I5
Total number of discrete rings between regions.		
C. Number of kinematic links	11-15	I5
Total number of kinematic links between regions.		

	Column	Format
2. Discrete Ring Cards (inter-region, if any exist)		
A. Ring Location and Property Card		
a. Region joint number to which the ring is attached. If there are also radial discontinuities at this location necessitating kinematic links, or multi-connections, the joint number of the ring is the <u>independent</u> joint number of all the links (see Figure 2-13b).	1-2	I2
b. Ring extensional stiffness (EA)	3-16	E14.7
c. Ring bending stiffness about centroidal y axis (EI_y). See Figure 2-14.	17-30	E14.7
d. Ring cross-bending stiffness about centroidal axes (EI_{xy}).	31-44	E14.7
e. Ring torsional stiffness (GJ)	45-58	E14.7
f. Ring bending stiffness about centroidal x axis (EI_x).	59-72	E14.7
B. Ring Geometry Card (see Figure 2-14)		
a. Ring thermal coefficient of expansion (α_R).	1-12	E12.5
b. Ring centroidal radius (r_c).	13-24	E12.5
c. Distance (±) between ring centroid and shear center in the x direction (x_c).	25-36	E12.5
d. Distance (±) between ring centroid and shear center in the y direction (y_c).	37-48	E12.5
e. Offset (±) of ring shear center from attached shell joint (see item Aa) in the x direction ($\overline{x}$).	49-60	E12.5
f. Offset (±) of ring shear center from shell joint (see item Aa) in the y direction ($\overline{y}$).	61-72	E12.5

<u>Note</u>: The shear center (S) is the origin of the x,y axes shown in Figure 2-14.

		Column	Format
C.	Ring Thermal Description Card (See Figure 2-14)		
a.	Distance (±) between ring shear center and the closest (innermost) radially measured ring point, x_I (in x = radial direction).	1-14	E14.7
b.	Distance (±) between ring shear center and the farthest (outermost) radially measured ring point, x_O (in x = radial direction). <u>Note</u>: Items a & b cannot both be input as zero.	15-28	E14.7
c.	Innermost point temperature (T_I).	29-42	E14.7
d.	Outermost point temperature (T_O).	43-56	E14.7
e.	Ring stress-free temperature (room or manufacuturing temperature (see Note for Master Clue Card item F).	57-70	E14.7
f.	Load Case Number (Stability analysis <u>only</u>)	71-72	I2

Enter the load case number (either 1 or 2) which contains the above described thermal load. This should be consistent with the segment thermal load order.
<u>Note</u>: Thermal loads on the ring are input on the above cards. Mechanical loads on the ring must be input as line loads or moments on the shell joint (item Aa) assigned to the ring.

The number of sets of discrete ring cards must equal the number specified in item 1B, of the Joint Control Data Card.

		Column	Format
D.	Ring Prestress Card (Stability analysis <u>only</u>)		
a.	Radius of revolution at the region joint which is used to identify the ring (Item Aa).	1-14	E14.7
b.	Hoop prestress in the ring due to load condition 1. (Enter <u>only</u> if the prestress input clue, item I page 2-15, is set to <u>unity</u>.)	15-28	E14.7
c.	Hoop prestress in the ring due to load condition 2. (Enter <u>only</u> if the prestress input clue, item I page 2-15, is set to <u>unity</u>, and there are <u>two</u> loading conditions.)	29-42	E14.7

	Column	Format
D. Ring Mass Card (Vibrations analysis only)		
a. Radius of revolution at the region joint which is used to identify the ring (Item Aa).	1-14	E14.7
b. Ring mass density (ρ)	15-28	E14.7
c. Ring Young's Modulus (E)	29-42	E14.7
D-A-S-H S-E-P-A-R-A-T-O-R C-A-R-D (See General Notes - Data Debugging)	minus in 1-80	

3. Kinematic Link Cards (inter-region, if any exist)

	Column	Format
A. Joint (j) dependent joint	1-2	I2
B. Joint (i) independent joint	3-4	I2

For kinematic links between regions there are no restrictions upon joint numbering.

The only restriction is that between successive kinematic link data cards the (j) joint entry should be in increasing order (not necessarily consecutive). For example:

	j	i	γ
Must be in increasing order.	3	2	—
	4	2	—
	9	1	—
	12	6	—

	Column	Format
C. Angle γ in radians (see Figure 2-15)	5-19	E14.7

γ cannot equal 0 or π.

The angle γ describes the orientation of the link; it is the inclination angle of the link from the vertical (Z axis). The number of kinematic link cards must equal the number specified in item 1C of the joint Control Data Card.

	Column	Format
D-A-S-H S-E-P-A-R-A-T-O-R C-A-R-D (See General Notes - Data Debugging)	minus in 1-80	

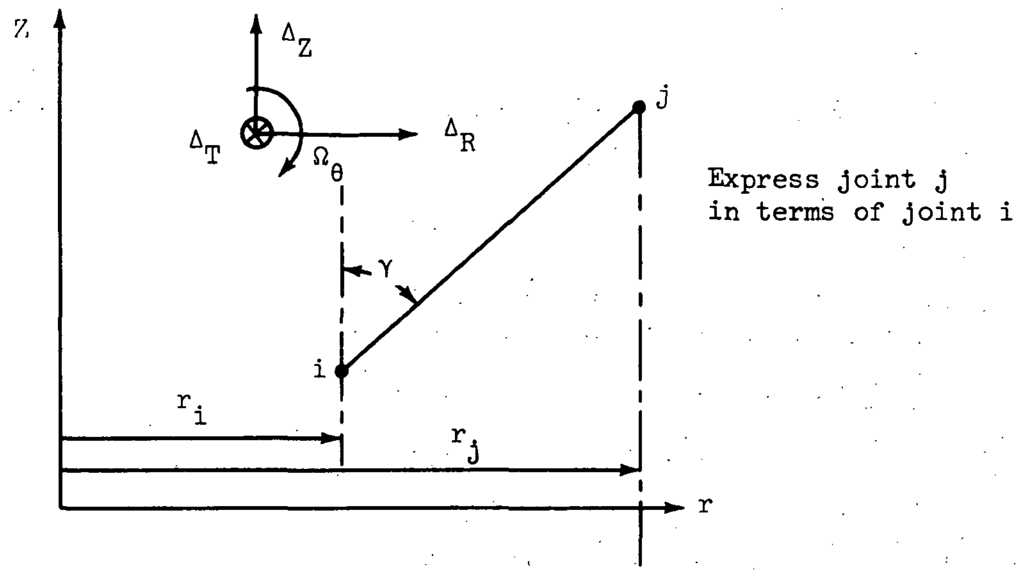
4. Boundary Condition Cards (Joint Data - one card per region joint)

This is the first set of boundary conditions. If the number of boundary condition sets is input as greater than 1 (item H page 2-14), they will be used for the static analysis and for the n = 0 eigenvalue analysis. If the eigenvalue harmonic search is specified to start with a harmonic other than zero (item D page 2-14) then they will be used for static analysis only. If the number of boundary conditions is input as unity, these will be used throughout the analysis.

	Column	Format
A. Joint Number	1-2	I2
B. Joint component conditions on:		
1) Δ_T	3-4	F2.0
2) Δ_Z or Δ_N (see Figure 2-16)	5-6	F2.0
3) Δ_R or Δ_Q	7-8	F2.0
4) Ω_θ	9-10	F2.0
C. Angle α in radians	11-24	E14.1

To be used only in conjunction with a 2 or 3 code.

Note: There must be as many boundary condition cards as there are joints as indicated in item 1A of the Joint Control Data Card.



$$\begin{Bmatrix} \Delta_{T_j} \\ \Delta_{Z_j} \\ \Delta_{R_j} \\ \Omega_{\theta_j} \end{Bmatrix} = \left[\begin{array}{c:c:c:c} \dfrac{r_j}{r_i} & 0 & 0 & 0 \\ 0 & +1 & 0 & -(r_j - r_i) \\ 0 & 0 & +1 & (r_j - r_i)\cot\gamma \\ 0 & 0 & 0 & +1 \end{array}\right] \begin{Bmatrix} \Delta_{T_i} \\ \Delta_{Z_i} \\ \Delta_{R_i} \\ \Omega_{\theta_i} \end{Bmatrix}$$

Figure 2-15. Kinematic Link

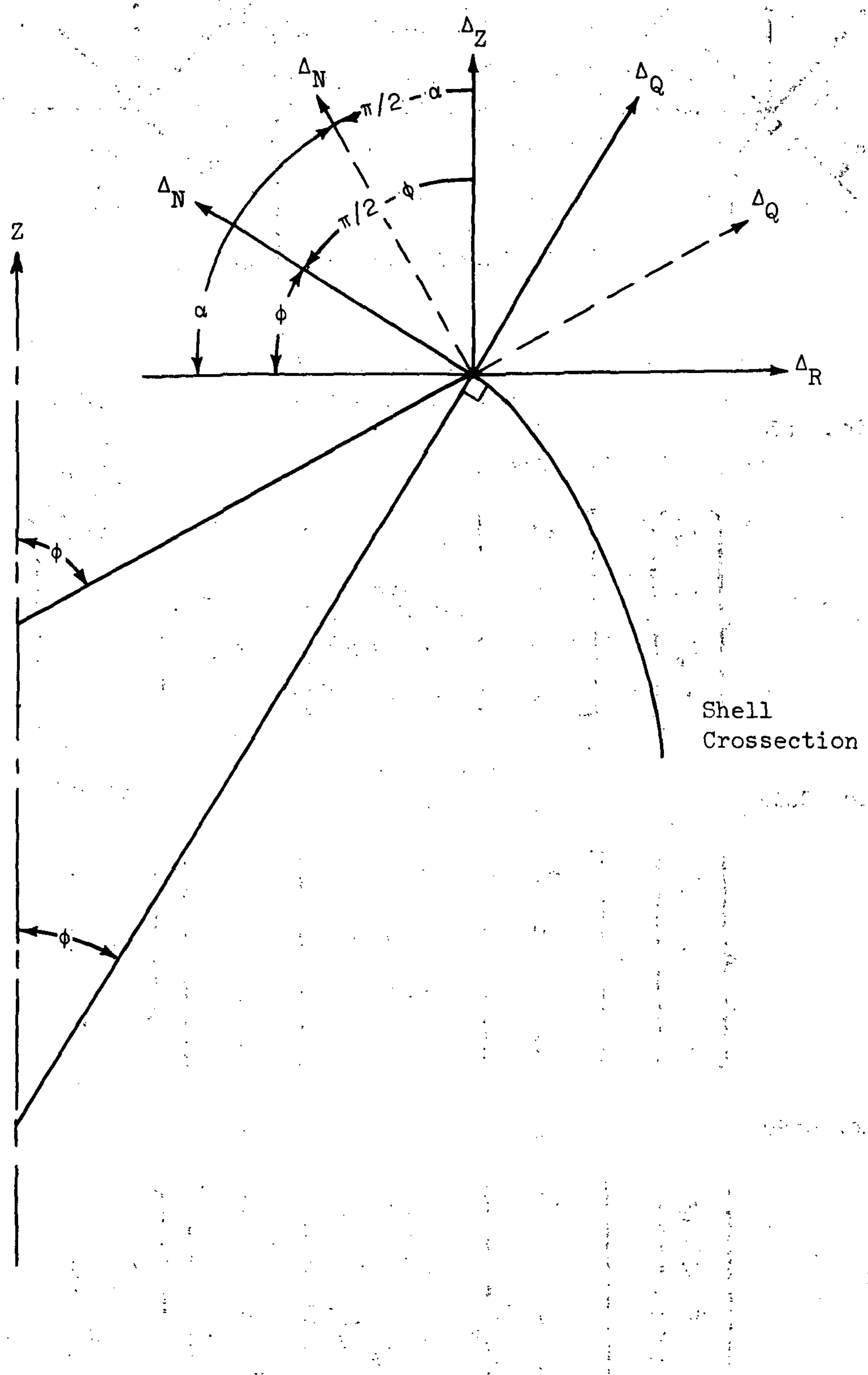
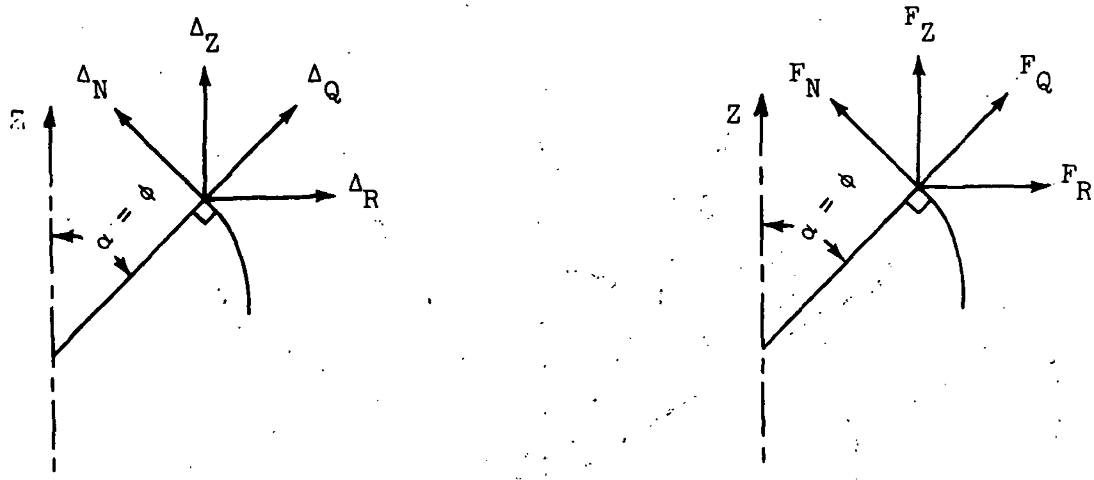


Figure 2-16a. Description of General Coordinate Rotation ($\alpha \neq \phi$)



Rotation Code 1 2 3 1

Matrix

$$\begin{Bmatrix} \Delta_T \\ \Delta_Z \\ \Delta_R \\ \Omega_\theta \end{Bmatrix} = \begin{bmatrix} +1 & 0 & 0 & 0 \\ 0 & \sin\alpha & \cos\alpha & 0 \\ 0 & -\cos\alpha & \sin\alpha & 0 \\ 0 & 0 & 0 & +1 \end{bmatrix} \begin{Bmatrix} \Delta_T \\ \Delta_N \\ \Delta_Q \\ \Omega_\theta \end{Bmatrix}$$

Rotation Code 1 2 0 1

Matrix

$$\begin{Bmatrix} \Delta_T \\ \Delta_Z \\ \Delta_R \\ \Omega_\theta \end{Bmatrix} = \begin{bmatrix} +1 & 0 & 0 \\ 0 & \sin\alpha & 0 \\ 0 & -\cos\alpha & 0 \\ 0 & 0 & +1 \end{bmatrix} \begin{Bmatrix} \Delta_T \\ \Delta_N \\ \Omega_\theta \end{Bmatrix}$$

Rotation Code 1 0 3 1

Matrix

$$\begin{Bmatrix} \Delta_T \\ \Delta_Z \\ \Delta_R \\ \Omega_\theta \end{Bmatrix} = \begin{bmatrix} +1 & 0 & 0 \\ 0 & \cos\alpha & 0 \\ 0 & \sin\alpha & 0 \\ 0 & 0 & +1 \end{bmatrix} \begin{Bmatrix} \Delta_T \\ \Delta_Q \\ \Omega_\theta \end{Bmatrix}$$

Figure 2-16b. Provision for Local Rotations

There are 4 different codes that are used to prescribe joint component conditions. They are:

a. 0 = no displacement allowed.

b. 1 = displacement allowed in the indicated direction.

c. 2 = Δ_Z and Δ_R are rotated through an angle of $(\pi/2 - \alpha)$ and become Δ_N and Δ_Q respectively, while a displacement is allowed in the Δ_N direction.

d. 3 = Δ_Z and Δ_R are rotated through an angle of $(\pi/2 - \alpha)$ and become Δ_N and Δ_Q respectively, while a displacement is allowed in the Δ_Q direction.

See Figure 2-16 for a geometric explanation of codes 2 and 3.

When using rotation codes:

Code 2 can exist only as Δ_Z coding.

Code 3 can exist only as Δ_R coding.

Codes 0 and 1 can appear in either column 4 or column 6, in addition to columns 8 and 10. Thus, there are twelve possible boundary conditions when rotation codes are used. ($\alpha = \phi$ for table below.)

	Free edge (possible to apply shear and/ or membrane loads)	$\Delta_Q = 0$, normal support (possible to apply membrane load)	$\Delta_N = 0$, membrane support (possible to apply shear load)
Δ_T, Ω_θ free	1,2,3,1	1,2,0,1	1,0,3,1
Δ_T, Ω_θ fixed	0,2,3,0	0,2,0,0	0,0,3,0
Δ_T fixed Ω_θ free	0,2,3,1	0,2,0,1	0,0,3,1
Δ_T free Ω_θ fixed	1,2,3,0	1,2,0,0	1,0,3,0

Column Format

Apex boundary conditions:

Since the closed apex ($\phi = 0$) angle is not acceptable input, the apex boundary conditions must be simulated at a small ϕ angle. These boundary conditions vary per Fourier harmonic, and are as follows:

n	Δ_T	Δ_Z	Δ_R	Ω_θ	angle
0.0	0	0	3	0	$\alpha = \phi$
1.0	1	2	0	1	$\alpha = \phi$
$\geq$2.0	0	0	0	0	---

For a further discussion see Reference 1, Appendix C.

General Notes:

1) To establish a datum for measuring displacement, free body motion must be eliminated from the structure. This should be accomplished by suitably applied boundary conditions.

2) The ability of a dependent joint in a kinematic link to prescribe motion independently should be removed by setting all boundary conditions of that joint to zero. See pages 2-63 and 2-74.

3) In the axisymmetric static and eigenvalue analysis all torsion degrees of freedom should be removed. A second boundary condition set, allowing torsional freedom, should be used for the other harmonic eigenvalue analyses.

D-A-S-H S-E-P-A-R-A-T-O-R C-A-R-D
(See General Notes - Data Debugging) minus in 1-80

		Column	Format

JOINT LOAD DATA (These card sets are omitted if the Prestress input clue is set to unity in a stability analysis, or if the Dynamic analysis description clue is FREV, CRSP or CRSR in a vibrations analysis.)

1. Load Control Data Card

		Column	Format
A.	Number of Joint Loads	1-4	I4

Total number of joint loads in analysis. (Line loads can only be applied to region joints.)

		Column	Format
B.	Any alphameric information (load description)	5-68	16A4

Note: If there are no Joint Loads for the structure, card 1 of the JOINT LOAD DATA is blank and card set 2 is omitted.

2. Joint Load Cards (as many as in item 1A above)

		Column	Format
A.	Load Condition Number	1-5	I5

Number of loading condition in which the line load exists. (See Program Control Card item 2G. For a vibrations analysis this number is always unity.)

		Column	Format
B.	Row Identification	6-10	I5

The identification is the location of the degree of freedom at which the load is applied. This is obtained by counting the non-zero codes entered in the Boundary Conditions Cards, starting with Joint 1; T, Z, R, Ω_θ, Joint 2; T, Z,......etc., and stopping at the joint and degree of freedom where the line load is to be applied. The location number of this degree of freedom is the information necessary.

		Column	Format
C.	Applied Joint Load	11-24	E14.7

The input is $2\pi r_o$ times the running load in lb./in. In the particular case of the axial axisymmetric load, this is simply the net force. For sign convention see Figures 2-11, 2-16 and 2-17.

D-A-S-H S-E-P-A-R-A-T-O-R C-A-R-D (See General Notes - Data Debugging) — minus in 1-80

	Column	Format
SUPPLEMENTARY BOUNDARY CONDITION DATA (The maximum number of sets of this data can be two. If the number of boundary conditions is input as 2 (item H page 2-14) the set of boundary conditions here will be used on all the eigenvalue analyses other than n=0. If the number of boundary conditions is input as 3 (item H page 2-14) the first set of the boundary conditions here will be used on the first $n \neq 0$ eigenvalue analysis, while the second set here will be used on all the following eigenvalue analyses.		
1. Boundary Condition Card Set 2 (Omitt unless the number of boundary conditions is iput as ≥ 2)		
Joint Data - one card per region joint (See notes on page 2-64).		
A. Joint Number	1-2	I2
B. Joint component conditions on:		
1) Δ_T	3-4	F2.0
2) Δ_Z or Δ_N (see Figure 2-16)	5-6	F2.0
3) Δ_R or Δ_Q	7-8	F2.0
4) Ω_θ	9-10	F2.0
C. Angle α in radians	11-24	E14.1
Note: There must be as many boundary condition cards as there are joints as indicated in item 1A of the Joint Control Data Card.		
D-A-S-H S-E-P-A-R-A-T-O-R C-A-R-D (See General Notes - Data Debugging)	minus in 1-80	
2. Boundary Condition Card Set 3 (Omitt unless the number of boundary conditions is input as 3)		
Joint Data - one card per region joint (see notes on page 2-64).		
A. Joint Number	1-2	I2
B. Joint component condition on:		
1) Δ_T	3-4	F2.0
2) Δ_Z or Δ_N(see Figure 2-16)	5-6	F2.0
3) Δ_R or Δ_Q	7-8	F2.0
4) Ω_θ	9-10	F2.0
C. Angle α in radians	11-24	E14.1
Note: There must be as many boundary condition cards as there are joints as indicated in item 1A of the Joint Control Data Card.		
D-A-S-H S-E-P-A-R-A-T-O-R C-A-R-D (See General Notes - Data Debugging)	minus in 1-80	

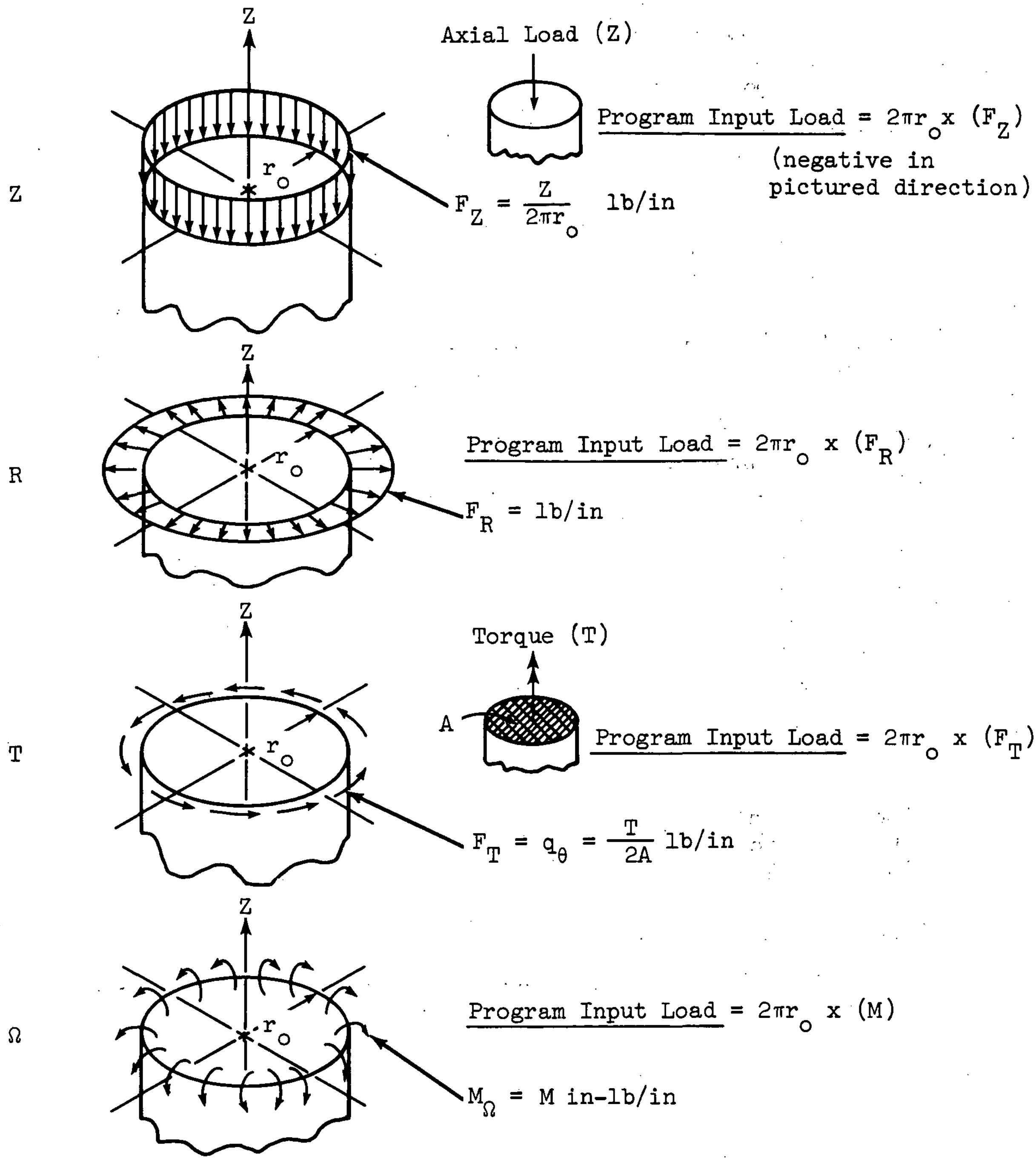


Figure 2-17a. Line Loading for Harmonic n = 0.0

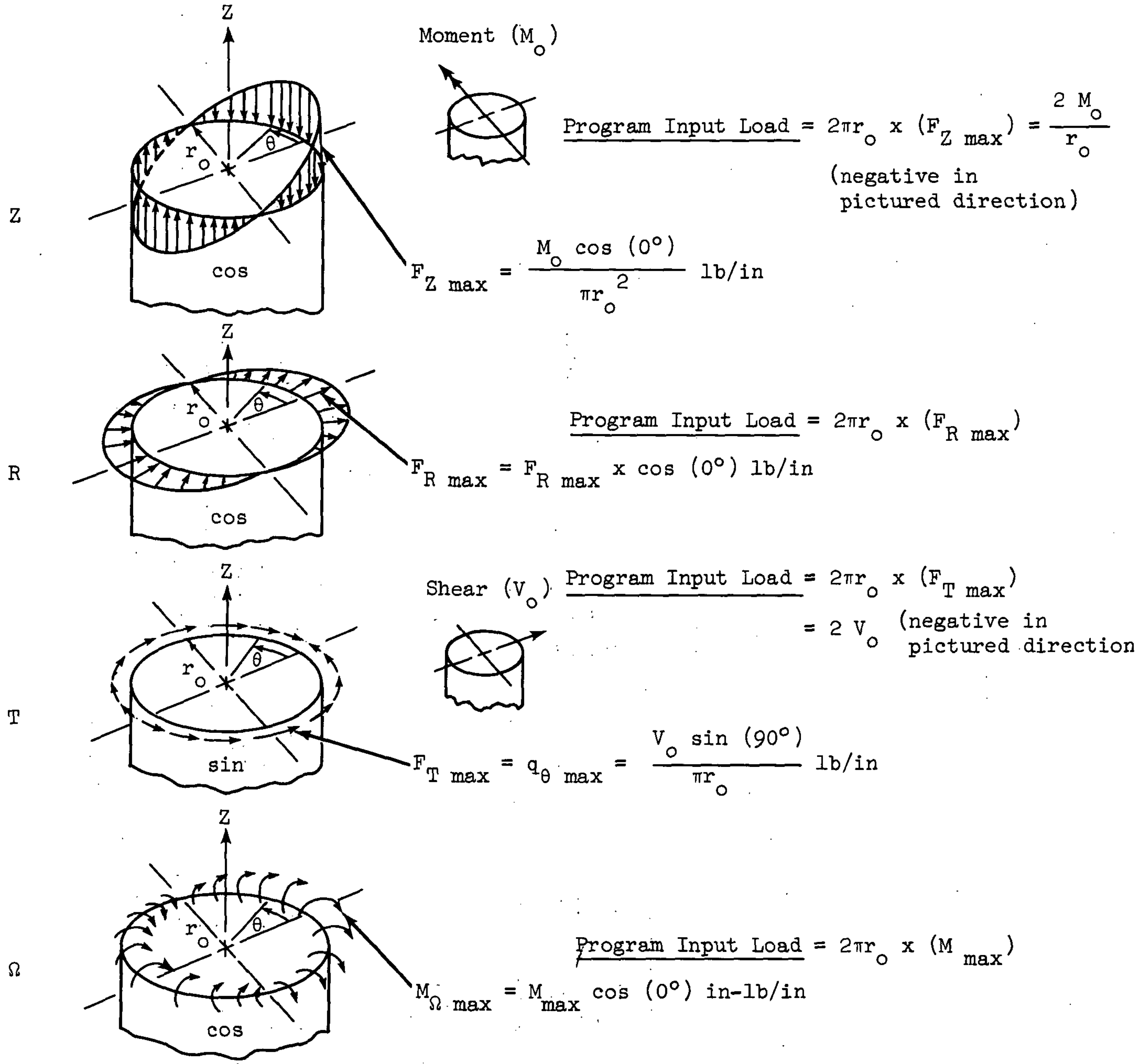


Figure 2-17b Line Loading for Harmonic n = 1.0

It is hoped that the user is now able to use the STARS-2B,-2V programs to good advantage. They are powerful tools, which will increase in value to the user as he uses them. One of the more complex areas of usage is the description of topology, especially when involved with rotation codes and joint loads. An illustrative example of a Y joint representation is therefore presented below. (See Figures 2-18 and 2-19 for the structure and idealization.) The idealized structure contains four regions and two kinematic links. The joints are numbered from 1 to 7. Membrane loading is applied to joints 1 and 5 and the structure is supported by membrane action at joint 7. All regions must be coupled.

The second card in each region description (topology card) is as follows:

Region	Joint (i)	Joint (j)
1	1	2
2	2	3
3	4	5
4	6	7

The Joint Control Data card would contain a 7 in column 5 and a 2 in column 15.

In this example, the restraints at joints 1, 5 and 7 must be rotated from the fixed (global system) to a local system such that membrane action may be applied. In addition, joints 3 and 4, and 6 and 3 are to be coupled with kinematic links. Thus, the motions of joints 4 and 6 are dependent upon the motion of joint 3. This dependence will be insured by using 2 kinematic link cards and setting the displacements of joints 4 and 6 equal to zero. It should be noted in this particular case that the motion of joints 4 and 6 is not being equated to zero, but rather, <u>the ability to prescribe motion independently</u> is being removed. The required data has the following appearance.

A. Kinematic Link Cards (2 cards)

Joint (j)	Joint (i)	Angle
4	3	$\gamma+\pi$
6	3	γ

<u>Note</u>: In a double link of the type shown in Figure 2-19, one joint must be consistently independent (joint 3 in example).

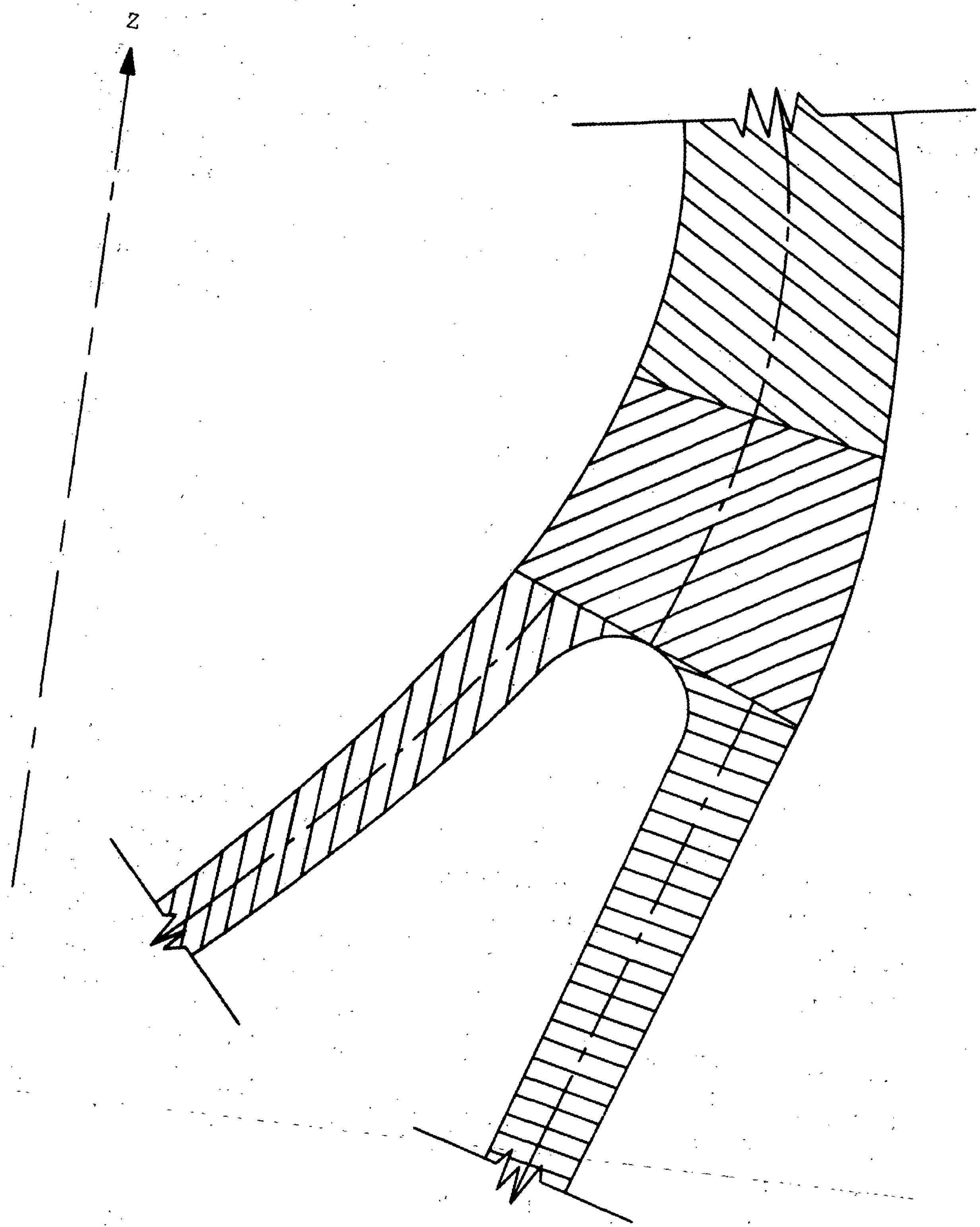


Figure 2-18. Y-Joint (Distorted Geometry)

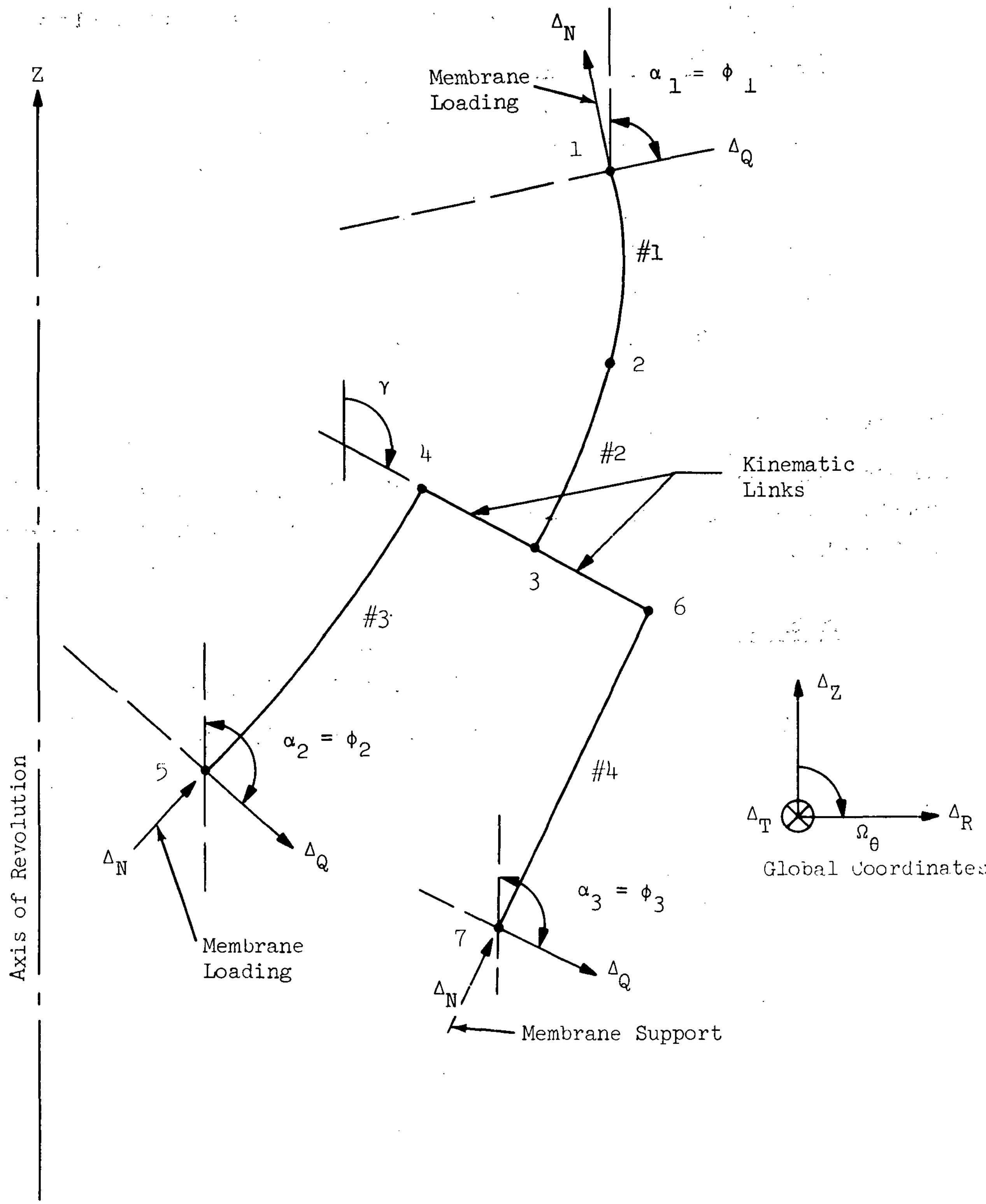


Figure 2-19. Idealized Y-Joint

B. Boundary Condition Cards for higher harmonic eigenvalue analysis (7 cards)

Joint	T	Z	R	θ	Angle
1	1	2	3	1	α_1
2	1	1	1	1	
3	1	1	1	1	
4	0	0	0	0	
5	1	2	3	1	α_2
6	0	0	0	0	
7	0	0	3	1	α_3

The Load Control Data card would contain a 2 in column 4.

The external membrane loads (one load problem assumed) are applied to the structure through the Joint Load Cards which, in this example, would appear as (2 cards):

Problem No.	Row	Load
1	2	$2\pi r_o$ x Membrane Load (lb./in.)
1	14	$2\pi r_o$ x Membrane Load (lb./in.)

SECTION 3

OUTPUT INFORMATION

The output of the STARS-2B,-2V programs is straightforward, however a description is in order since the user should learn the significance of the various checks that are provided. It is important to point out that the output of the program will include a print-out of the input data. This gives the user the opportunity to check whether or not the input data was correct. In the detailed description of the complete output which follows, the user should refer to the output of the problems in Section 4 as an example.

The title page of the output contains all the data from the General Introductory Cards, prominently placed, and needs no comment. The next page of the output contains the first region Identification Card in the center. The following output is then presented for each segment in this region (in order of appearance):

1. Contents of segment Identification Card.
2. Contents of MAGIC Control Card
3. Contents of Geometric Description Card (Cards)
4. Contents of Master Clue Card
5. The material property table used for the segment
6. Crossection description table
7. Temperature load table (if any)
8. Distributed load tables (printed per loading condition; if any)
9. Prestress input (if any) STABILITY ONLY
10. Segment influence coefficients (MAGIC output)
11. Segment stiffness matrix
12. Stiffness matrix symmetry check
13. Segment load matrices
14. Radius of revolution at i^{th} and j^{th} ends of segment

Item 12, the stiffness matrix symmetry check, is a check upon the validity of segment sizing and the accumulation of round-off error. For perfect symmetry to exist, it is necessary to have zeros above the main diagonal, and zeros or ones below the diagonal. The amount of error induced by improper sizing or round-off is related to the amount that the off-diagonal terms in the lower triangle differ from unity. An attempt should be made to keep the upper limit on this difference at one percent (maximum number in lower triangle should be 0.1010... E 01).

As mentioned previously, items 1-14 are repeated for all the segments within region one. The radius of revolution at every joint should be checked at corresponding joints of adjacent segments to make sure that proper coupling has been specified. At this stage in the output, the topology of the segments within the region, and the description of the intra-region rings and kinematic links is presented.

Next the region matrices are presented. Given in order are: the region stiffness matrix, the stiffness matrix symmetry check, and the region load matrices. Again the numerical round-off, evident in the symmetry check, should be kept to a maximum of one percent (0.1010... E 01 in lower triangle). The output to this point, that is, sets of items 1-14, segment topology and links, and the region matrices, are now repeated as a group for each region within the structure. When this is completed, the region topology is presented. The next items to be provided by the output are the descriptions of the inter-region rings and kinematic links and the boundary conditions. At external points of the structure these are physical boundary conditions. At internal points they merely state the fact that no restraint exists and the joint in question is free to move. The last column in this set, gives the angle α, which is zero unless a rotation code is indicated. It is important to refer to Figure 2-6 once more and point out that α represents a rotation of the coordinate system.

There are a variety of errors that can be made in submitting input data The STARS-2B,-2V programs are set so that as an error is detected, (input or in the matrix calculations) the program is stopped. Therefore, to avoid delays in getting an answer, the SATELLITE-1B,-1V programs were created to debug input data, and to check for other possible inconsistencies. The use of these programs is described in Reference 3, and all the STARS error messages are contained in the listings therein.

After having corrected any errors, so that it is now possible for the program to run to completion, the problem solution can be discussed. From the above point in the output, further output will depend upon the intermediate print clue. If this clue is set for full output all stiffness and prestressed (or dynamic in the case of vibrations) stiffness matrices will be printed for all segments, regions, and structures in all harmonics and all estimates. If the print clue is set for abbreviated print, only that noted below will be printed:

1. The applied line loads.
2. The region end deflections per problem, in numerical order, starting from region joint 1.
3. A description of the calculated prestress state (if any). This will include the hoop and meridional stress resultants and the meridional rotation. The print will be for two loading cases if so input.
4. New boundary conditions for eigenvalue analyses (if any).
5. The current harmonic number and the current estimate (iteration) number for that harmonic.
6. All the eigenvalues for the estimated prestress or frequency state, and the current load (frequency) multiplier for the next estimate.
7. Prints 5 and 6 are repeated until convergence (or a cutoff value) is reached for this harmonic. At this point the load multiplier represents the lowest eigenvalue. (The frequency is printed in a vibrations analysis.) Two eigenvectors are then printed in global coordinates, and expanded in local deformation coordinates throughout all the segments in shell. In a stability analysis these two vectors will correspond to the lowest two eigenvalues. In a vibrations analysis they will correspond to the two lowest eigenvalues, or the two eigenvalues closest to the estimated frequency, as requested by input.

8. Prints 4-7 are repeated for all the harmonics under investigation.

SECTION 4

EXAMPLES OF INPUT AND SOLUTIONS

This section contains the full input and output of two example test problems for the STARS-2B program, and one example test problem for the STARS-2V program. Since the test problem for the STARS-2S program [6] exemplified all crossection options available in the programs, the present test problems will be more physical in nature, while still exemplifying various analysis options. A comparative description of the present test problems with other analyses is presented in Reference 1.

The first stability test problem is presented in Figure 4-1. A prolate spheroid is loaded in hydrostatic compression and the stability load is being sought. Since it is known [1] that the critical harmonic for this case is n = 3, only the 2nd and 3rd harmonics are investigated. The input is set so that the program will calculate the prestress state, and a cutoff value is set at 1.5. No intermediate output is required. It should be noted in this problem, that the boundary conditions to simulate an apex must be changed for harmonics n = 2, 3 from those used for the n = 0 static analysis (see Section 2).

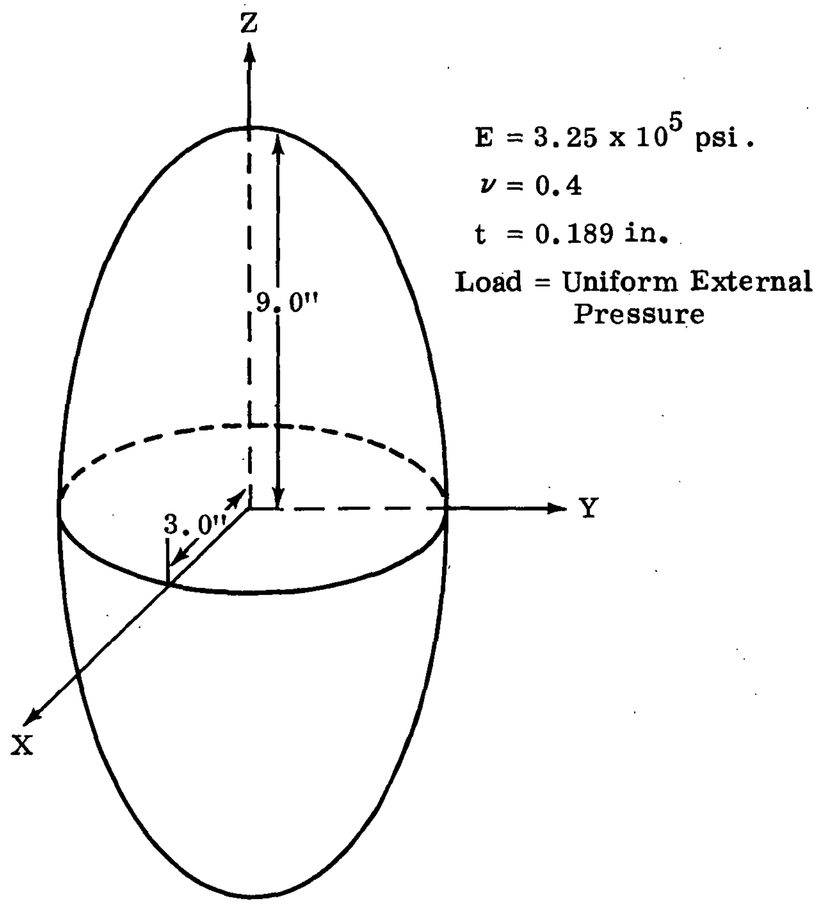


Figure 4-1 Test Problem 1

```
 ELLIPSE STABILITY TEST
10 20 1 2 3 1 1 2 0          1.40
EPRE      ISØT


 3.25    E 05

  .4


--------------------------------------------------------------------------------
 2 0  ELLIPSE REGIØN
    1    1    2
11   ELLIPSE SEGMENT
 .040909  E-01 1.0       E-04 .081818  E-02                          0.
  3.0             3.0
ISØT      EPRE       SING      THIC      NØTH      0.0               2
 .034091        .075
  .189            .189
000100
 137.             137.
    1    1    2
--------------------------------------------------------------------------------
11   ELLIPSE SEGMENT
 .05      E-01 1.0       E-04 .10      E-02                          0.
  3.0             3.0
ISØT      EPRE       SING      THIC      NØTH      0.0               2
 .075           .125
  .189            .189
000100
 137.             137.
    2    2    3
--------------------------------------------------------------------------------
 2 0  ELLIPSE REGIØN
    2    2    3
11   ELLIPSE SEGMENT
 .055     E-01 1.0       E-04 .110     E-02                          0.
  3.0             3.0
ISØT      EPRE       SING      THIC      NØTH      0.0               2
 .125           .18
  .189            .189
000100
 137.             137.
    1    1    2
--------------------------------------------------------------------------------
11   ELLIPSE SEGMENT
 .06      E-01 1.0       E-04 .12      E-02                          0.
  3.0             3.0
ISØT      EPRE       SING      THIC      NØTH      0.0               2
 .18            .24
  .189            .189
000100
```

```
 137.           137.
   2    2    3
---------------------------------------------------------------------------------------------------
 2 0  ELLIPSE REGIØN
   3    3    4
11   ELLIPSE SEGMENT
 .07       E-01 1.0      E-04 .14       E-02                                  0.
  3.0           3.0
ISØT       EPRE         SING       THIC       NØTH       0.0                   3
 .24            .275               .31
 .189           .189               .189
000100
 137.           137.               137.
   1    1    2
---------------------------------------------------------------------------------------------------
11   ELLIPSE SEGMENT
 .08       E-01 1.0      E-04 .16       E-02                                  0.
  3.0           3.0
ISØT       EPRE         SING       THIC       NØTH       0.0                   3
 .31            .35                .39
 .189           .189               .189
000100
 137.           137.               137.
   2    2    3
---------------------------------------------------------------------------------------------------
 2 0  ELLIPSE REGIØN
   4    4    5
11   ELLIPSE SEGMENT
 .09       E-01 1.0      E-04 .18       E-02                                  0.
  3.0           3.0
ISØT       EPRE         SING       THIC       NØTH       0.0                   3
 .39            .435               .48
 .189           .189               .189
000100
 137.           137.               137.
   1    1    2
---------------------------------------------------------------------------------------------------
11   ELLIPSE SEGMENT
 .10       E-01 1.0      E-04 .20       E-02                                  0.
  3.0           3.0
ISØT       EPRE         SING       THIC       NØTH       0.0                   3
 .48            .53                .58
 .189           .189               .189
000100
 137.           137.               137.
   2    2    3
---------------------------------------------------------------------------------------------------
 2 0  ELLIPSE REGIØN
   5    5    6
11   ELLIPSE SEGMENT
 .10       E-01 1.0      E-04 .20       E-02                                  0.
  3.0           3.0
ISØT       EPRE         SING       THIC       NØTH       0.0                   3
 .58            .63                .68
 .189           .189               .189
000100
 137.           137.               137.
   1    1    2
---------------------------------------------------------------------------------------------------
11   ELLIPSE SEGMENT
 .10       E-01 1.0      E-04 .20       E-02                                  0.
```

```
  3.0           3.0
ISØT      EPRE      SING      THIC      NØTH      0.0           3
 .68          .73            .78
 .189         .189           .189
000100
 137.         137.           137.
   2    2    3
-----------------------------------------------------------------
 2 0  ELLIPSE REGIØN
   6    6    7
11   ELLIPSE SEGMENT
 .10       E-01 1.0      E-04 .20      E-02                    0.
  3.0           3.0
ISØT      EPRE      SING      THIC      NØTH      0.0           3
 .78          .83            .88
 .189         .189           .189
000100
 137.         137.           137.
   1    1    2
-----------------------------------------------------------------
11   ELLIPSE SEGMENT
 .10       E-01 1.0      E-04 .20      E-02                    0.
  3.0           3.0
ISØT      EPRE      SING      THIC      NØTH      0.0           3
 .88          .93            .98
 .189         .189           .189
000100
 137.         137.           137.
   2    2    3
-----------------------------------------------------------------
 2 0  ELLIPSE REGIØN
   7    7    8
11   ELLIPSE SEGMENT
 .08       E-01 1.0      E-04 .16      E-02                    0.
  3.0           3.0
ISØT      EPRE      SING      THIC      NØTH      0.0           3
 .98          1.02           1.06
 .189         .189           .189
000100
 137.         137.           137.
   1    1    2
-----------------------------------------------------------------
11   ELLIPSE SEGMENT
 .08       E-01 1.0      E-04 .16      E-02                    0.
  3.0           3.0
ISØT      EPRE      SING      THIC      NØTH      0.0           3
 1.06         1.10           1.14
 .189         .189           .189
000100
 137.         137.           137.
   2    2    3
-----------------------------------------------------------------
 2 0  ELLIPSE REGIØN
   8    8    9
11   ELLIPSE SEGMENT
 .08       E-01 1.0      E-04 .16      E-02                    0.
  3.0           3.0
ISØT      EPRE      SING      THIC      NØTH      0.0           3
 1.14         1.18           1.22
 .189         .189           .189
000100
```

```
137.           137.           137.
   1    1    2
--------------------------------------------------------------------------------
11   ELLIPSE SEGMENT
 .08      E-01 1.0      E-04 .16      E-02                            0.
  3.0          3.0
ISØT      EPRE      SING       THIC       NØTH      0.0               5
 1.22          1.24            1.26             1.28          1.3
 .189           .189           .189             .189          .189
000100
 137.           137.           137.             137.          137.
   2    2    3
--------------------------------------------------------------------------------
 2 0  ELLIPSE REGIØN
   9    9   10
11   ELLIPSE SEGMENT
 .08      E-01 1.0      E-04 .16      E-02                            0.
  3.0          3.0
ISØT      EPRE      SING       THIC       NØTH      0.0               5
 1.3           1.32            1.34             1.36          1.38
 .189           .189           .189             .189          .189
000100
 137.           137.           137.             137.          137.
   1    1    2
--------------------------------------------------------------------------------
11   ELLIPSE SEGMENT
 .065     E-01 1.0      E-04 .13      E-02                            0.
  3.0          3.0
ISØT      EPRE      SING       THIC       NØTH      0.0               5
 1.38          1.395           1.41             1.43          1.445
 .189           .189           .189             .189          .189
000100
 137.           137.           137.             137.          137.
   2    2    3
--------------------------------------------------------------------------------
 2 0  ELLIPSE REGIØN
   10   10   11
11   ELLIPSE SEGMENT
 .06      E-01 1.0      E-04 .12      E-02                            0.
  3.0          3.0
ISØT      EPRE      SING       THIC       NØTH      0.0               5
 1.445         1.46            1.475            1.49          1.505
 .189           .189           .189             .189          .189
000100
 137.           137.           137.             137.          137.
   1    1    2
--------------------------------------------------------------------------------
11   ELLIPSE  SEGMENT
 .065794  E-01 1.0      E-04 .131586  E-02                            0.
  3.0          3.0
ISØT      EPRE      SING       THIC       NØTH      0.0               5
 1.505         1.52            1.54             1.555         1.570793
 .189           .189           .189             .189          .189
000100
 137.           137.           137.             137.          137.
   2    2    3
--------------------------------------------------------------------------------
   11    0    0
 1 0 1 0 0
 2 0 1 1 1
 3 0 1 1 1
```

4	0	1	1	1
5	0	1	1	1
6	0	1	1	1
7	0	1	1	1
8	0	1	1	1
9	0	1	1	1
10	0	1	1	1
11	0	0	1	0

1	0	0	0	0
2	1	1	1	1
3	1	1	1	1
4	1	1	1	1
5	1	1	1	1
6	1	1	1	1
7	1	1	1	1
8	1	1	1	1
9	1	1	1	1
10	1	1	1	1
11	1	0	1	0

```
                 UNSYMMETRIC, ORTHOTROPIC, REINFORCED SHELL ANALYSIS WITH COUPLING OF AT MOST 29 SHELL REGIONS

                                              STARS-2B

                                        AS OF NOVEMBER 1, 1972

NUMBER OF SEGMENTS =  20 NUMBER OF REGIONS = 10 NUMBER OF MATERIAL PROPERTY TABLES USED =  1 NUMBER OF PROBLEMS =  1
NUMBER OF BOUNDARY CONDITION MATRICES =  2

                        STABILITY HARMONICS (N) =  2 TO  3 INCREMENTED BY  1

                   THE GIVEN INPUT INDICATES THAT THE PREBUCKLING STATE WILL BE CALCULATED


ELLIPSE STABILITY TEST


                                                      FOR INFORMATION CALL   V. SVALBONAS
                                                                                            (516) 575-7701
                                                                             P. OGILVIE
```

REGION NUMBER 1

THERE ARE 2 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

```
        SEGMENT NUMBER  1      SEGMENT CODE 11        ELLIPSE SEGMENT

                 DTAU             DIFF               STEP           DELTA

              .4090900-02      .1000000-03       .8181800-03      .0000000

                                               GEOMETRY INPUT VARIABLES

                                .3000000+01       .3000000+01      .0000000

          ISOT       EPRE      SING       THIC       NOTH      T FREE =    .000                  NUMBER OF TABLE COLUMNS =  2

                                                 MATERIAL PROPERTY TABLE USED

   .00000     .00000     .00000     .00000     .00000     .00000     .00000     .00000     .00000     .00000
   .32500+06  .00000     .00000     .00000     .00000     .00000     .00000     .00000     .00000     .00000
   .40000+00  .00000     .00000     .00000     .00000     .00000     .00000     .00000     .00000     .00000
   .00000     .00000     .00000     .00000     .00000     .00000     .00000     .00000     .00000     .00000

                                       TABLE ORDER PHI OR S VS. CROSSECTION PROPERTIES
   .3409100-01    .7500000-01
   .1890000+00    .1890000+00

             PROBLEM   1     TABLE ORDER  PHI OR S VS. DISTRIBUTED LOADS (F THETA, F PHI, F ZETA, M THETA, M PHI)
 LOAD IDENTIFICATION CLUES 000100

   .1370000+03    .1370000+03

                                              MATRIX X AND Y (TRANSPOSED)  MAGIC OUTPUT
     .7828962-02     .0000000       .0000000      .0000000      .2202739+01    .0000000      .0000000      .0000000
     .0000000        .7135027+06   -.5361327+05  -.1074038+04   .0000000       .9777138+00  -.3771568-01   .6736526-01
     .0000000       -.2433345+05    .1828438+04   .3662923+02   .0000000       .4162911-01   .9990548+00  -.2297439-02
     .0000000       -.5277268+03    .3965389+02  -.2125024+04   .0000000       .9028239-03   .3860470-01   .9787812+00
     .2060993+00     .0000000       .0000000      .0000000      .1356762-05    .0000000      .0000000      .0000000
     .0000000        .7609962+00   -.4166462-01  -.8346698-03   .0000000       .4080881-06  -.8449482-08   .5235172-07
     .0000000        .2312501-01    .4532606+00   .2293497-01   .0000000       .6399895-08  -.3529527-07  -.2317467-05
     .0000000        .3051444-01   -.2292884-02   .7617164+00   .0000000      -.5220349-07  -.3044126-05  -.1371930-03
     .0000000       -.8160743-01   -.4070411+01  -.8187936-01   .0000000      -.1462235-07   .5553773-07   .5133763-05
```

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.3478717+06	.0000000	.0000000	.0000000	-.1579269+06	.0000000	.0000000	.0000000
FORCZ1	.0000000	.1311920+08	.6425479+06	-.2219254+06	.0000000	-.1311920+08	-.6576855+06	-.2914968+06
FORCR1	.0000000	.6425479+06	.5463329+06	-.1125690+05	.0000000	-.6425479+06	-.5584159+06	-.1495203+05
MOME 1	.0000000	-.2219254+06	-.1125690+05	.5283147+04	.0000000	.2219254+06	.1162910+05	.3369819+04
FORCT2	-.1579269+06	.0000000	.0000000	.0000000	.7169569+05	.0000000	.0000000	.0000000
FORCZ2	.0000000	-.1311920+08	-.6425479+06	.2219254+06	.0000000	.1311920+08	.6576855+06	.2914968+06
FORCR2	.0000000	-.6576855+06	-.5584159+06	.1162910+05	.0000000	.6576855+06	.9161192+06	.1564111+05
MOME 2	.0000000	-.2914968+06	-.1495203+05	.3369819+04	.0000000	.2914968+06	.1564111+05	.9098598+04

SEGMENT SYMMETRY CHECK

.3478717+06	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1311920+08	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.5463329+06	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.5283147+04	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.7169569+05	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1311920+08	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.9161192+06	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.9098598+04

SEGMENT LOAD MATRICES

.0000000
.7719603+00
.3141264-01
-.5034461-02
.0000000
.1156083+01
.7873083-01

```
.8052422-02
RZERO(I) =    3.410201-02          RZERO(J) =    7.511738-02
```

SEGMENT NUMBER 2 SEGMENT CODE 11 ELLIPSE SEGMENT

DTAU	DIFF	STEP	DELTA
.5000000-02	.1000000-03	.1000000-02	.0000000

GEOMETRY INPUT VARIABLES

.3000000+01	.3000000+01	.0000000

ISOT EPRE SING THIC NOTH T FREE = .000 NUMBER OF TABLE COLUMNS = 2

MATERIAL PROPERTY TABLE USED

.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.32500+06	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.40000+00	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000

TABLE ORDER PHI OR S VS. CROSSECTION PROPERTIES

.7500000-01	.1250000+00
.1890000+00	.1890000+00

PROBLEM 1 TABLE ORDER PHI OR S VS. DISTRIBUTED LOADS (F THETA, F PHI, F ZETA, M THETA, M PHI)

LOAD IDENTIFICATION CLUES 000100

.1370000+03	.1370000+03

MATRIX X AND Y (TRANSPOSED) MAGIC OUTPUT

.2603787-01	.0000000	.0000000	.0000000	.1671340+01	.0000000	.0000000	.0000000
.0000000	.2609403+06	-.3278849+05	-.8193686+03	.0000000	.9187997+00	-.4594955-01	.6384825-01
.0000000	-.1960730+05	.2463758+04	.6156813+02	.0000000	.5598673-01	.9984475+00	-.4797618-02
.0000000	-.5094756+03	.6401822+02	-.7766039+03	.0000000	.1454767-02	.4743060-01	.9203522+00
.3579942+00	.0000000	.0000000	.0000000	.1839895-05	.0000000	.0000000	.0000000
.0000000	.8060132+00	-.5609445-01	-.1401769-02	.0000000	.5532977-06	-.1324966-07	.1092309-06
.0000000	.3438619-01	.5970191+00	.3438872-01	.0000000	.1111363-07	-.7679359-07	-.4213415-05
.0000000	.3801114-01	-.4776295-02	.8072278+00	.0000000	-.1085382-06	-.5013740-05	-.1860786-03
.0000000	-.1368812+00	-.5547321+01	-.1383943+00	.0000000	-.2974204-07	.1422371-06	.1077575-04

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.4287382+06	.0000000	.0000000	.0000000	-.2565236+06	.0000000	.0000000	.0000000
FORCZ1	.0000000	.1260753+08	.1152076+07	-.2867468+06	.0000000	-.1260753+08	-.1146543+07	-.3411542+06
FORCR1	.0000000	.1152076+07	.8967101+06	-.2784656+05	.0000000	-.1152076+07	-.9649091+06	-.3356629+05
MOME 1	.0000000	-.2867468+06	-.2784656+05	.8859958+04	.0000000	.2867468+06	.2803992+05	.5228263+04
FORCT2	-.2565236+06	.0000000	.0000000	.0000000	.1534838+06	.0000000	.0000000	.0000000
FORCZ2	.0000000	-.1260753+08	-.1152076+07	.2867468+06	.0000000	.1260753+08	.1146543+07	.3411542+06
FORCR2	.0000000	-.1146543+07	-.9649091+06	.2803992+05	.0000000	.1146543+07	.1265185+07	.3409050+05
MOME 2	.0000000	-.3411542+06	-.3356629+05	.5228263+04	.0000000	.3411542+06	.3409050+05	.1266200+05

SEGMENT SYMMETRY CHECK

.4287382+06	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1260753+08	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.8967101+06	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.8859958+04	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1534838+06	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1260753+08	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1265185+07	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1266200+05

SEGMENT LOAD MATRICES

.0000000
.1889509+01
.1577990+00
-.1566924-01
.0000000
.2465665+01
.2884038+00

.2121776-01

RZERO(I) = 7.511738-02 RZERO(J) = 1.255451-01

INPUT DATA FOR SEGMENT COUPLING

REGION NUMBER 1 NUMBER OF SEGMENT JOINTS 3 NUMBER OF KINEMATIC LINKS 0

SEGMENT	JOINT(I)	JOINT(J)
1	1	2
2	2	3

REGION STIFFNESS MATRIX

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA RZ	THETA 2
FORCT1	.2980332+06	.0000000	.0000000	.0000000	-.8095370+05	.0000000	.0000000	.0000000
FORCZ1	.0000000	.1773356+07	.9587958+05	-.5510696+05	.0000000	-.1773356+07	-.9723642+05	-.8857167+05
FORCR1	.0000000	.9587958+05	.3545450+06	-.3482105+04	.0000000	-.9587958+05	-.2752501+06	-.5983746+04
MOME 1	.0000000	-.5510696+05	-.3482105+04	.2750048+04	.0000000	.5510695+05	.3798538+04	.1956229+04
FORCT2	-.8095370+05	.0000000	.0000000	.0000000	.2198918+05	.0000000	.0000000	.0000000
FORCZ2	.0000000	-.1773356+07	-.9587958+05	.5510695+05	.0000000	.1773357+07	.9723643+05	.8857168+05
FORCR2	.0000000	-.9723642+05	-.2752501+06	.3798538+04	.0000000	.9723643+05	.7238980+06	.7534205+04
MOME 2	.0000000	-.8857167+05	-.5983746+04	.1956229+04	.0000000	.8857168+05	.7534205+04	.6558416+04

REGION SYMMETRY CHECK

.2980332+06	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1773356+07	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.3545450+06	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.2750048+04	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.2198918+05	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1773357+07	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.7238980+06	.0000000

.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.6558416+04

REGION LOAD MATRIX

```
 .0000000
 .2193717+01
 .1059610+00
-.2978503-01
 .0000000
 .4089500+01
 .8459750+00
 .6405492-01
```

REGION NUMBER 2

THERE ARE 2 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 ELLIPSE SEGMENT

DTAU	DIFF	STEP	DELTA
.5500000-02	.1000000-03	.1100000-02	.0000000

GEOMETRY INPUT VARIABLES

.3000000+01	.3000000+01	.0000000

ISOT EPRE SING THIC NOTH T FREE = .000 NUMBER OF TABLE COLUMNS = 2

MATERIAL PROPERTY TABLE USED

.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.32500+06	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.40000+00	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000

TABLE ORDER PHI OR S VS. CROSSECTION PROPERTIES

.1250000+00	.1800000+00
.1890000+00	.1890000+00

PROBLEM 1 TABLE ORDER PHI OR S VS. DISTRIBUTED LOADS (F THETA, F PHI, F ZETA, M THETA, M PHI)
LOAD IDENTIFICATION CLUES 000100

.1370000+03	.1370000+03

MATRIX X AND Y (TRANSPOSED) MAGIC OUTPUT

.6100132-01	.0000000	.0000000	.0000000	.1446809+01	.0000000	.0000000	.0000000
.0000000	.1261373+06	-.2295315+05	-.6459470+03	.0000000	.9160505+00	-.5115705-01	.5647908-01
.0000000	-.1584981+05	.2884182+04	.8116656+02	.0000000	.6533095-01	.9980085+00	-.7096887-02
.0000000	-.4562117+03	.8301663+02	-.3744667+03	.0000000	.1880494-02	.5363725-01	.9179284+00
.4777354+00	.0000000	.0000000	.0000000	.2179723-05	.0000000	.0000000	.0000000
.0000000	.8415345+00	-.6554439-01	-.1844524-02	.0000000	.6554018-06	-.1651089-07	.1612769-06
.0000000	.4197390-01	.6894226+00	.4275503-01	.0000000	.1463022-07	-.1162355-06	-.5800433-05
.0000000	.3870921-01	-.7043897-02	.8431122+00	.0000000	-.1595604-06	-.6567227-05	-.2204675-03
.0000000	-.1789192+00	-.6572059+01	-.1844496+00	.0000000	-.4295018-07	.2360894-06	.1610857-04

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.5235875+06	.0000000	.0000000	.0000000	-.3618914+06	.0000000	.0000000	.0000000
FORCZ1	.0000000	.1352936+08	.1878344+07	-.3594667+06	.0000000	-.1352936+08	-.1858305+07	-.4068378+06
FORCR1	.0000000	.1878344+07	.1387801+07	-.5421759+05	.0000000	-.1878344+07	-.1485915+07	-.6215720+05
MOME 1	.0000000	-.3594667+06	-.5421759+05	.1285239+05	.0000000	.3594667+06	.5429303+05	.7254204+04
FORCT2	-.3618914+06	.0000000	.0000000	.0000000	.2501308+06	.0000000	.0000000	.0000000
FORCZ2	.0000000	-.1352936+08	-.1878344+07	.3594667+06	.0000000	.1352936+08	.1858305+07	.4068378+06
FORCR2	.0000000	-.1858305+07	-.1485915+07	.5429303+05	.0000000	.1858305+07	.1753775+07	.6260142+05
MOME 2	.0000000	-.4068378+06	-.6215720+05	.7254204+04	.0000000	.4068378+06	.6260142+05	.1662934+05

SEGMENT SYMMETRY CHECK

.5235875+06	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1352936+08	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1387801+07	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1285239+05	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.2501308+06	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1352936+08	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1753775+07	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1662934+05

SEGMENT LOAD MATRICES

.0000000
.3357190+01
.4536957+00
-.3152022-01
.0000000
.4056555+01
.6991845+00

.3932265-01

RZERO(I) = 1.255451-01 RZERO(J) = 1.816357-01

SEGMENT NUMBER 2 SEGMENT CODE 11 ELLIPSE SEGMENT

DTAU	DIFF	STEP	DELTA
.6000000-02	.1000000-03	.1200000-02	.0000000

GEOMETRY INPUT VARIABLES

.3000000+01 .3000000+01 .0000000

ISOT	EPRE	SING	THIC	NOTH	T FREE = .000

NUMBER OF TABLE COLUMNS = 2

MATERIAL PROPERTY TABLE USED

.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.32500+06	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.40000+00	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000

TABLE ORDER PHI OR S VS. CROSSECTION PROPERTIES

.1800000+00	.2400000+00
.1890000+00	.1890000+00

PROBLEM 1 TABLE ORDER PHI OR S VS. DISTRIBUTED LOADS (F THETA, F PHI, F ZETA, M THETA, M PHI)
LOAD IDENTIFICATION CLUES 000100

.1370000+03 .1370000+03

MATRIX X AND Y (TRANSPOSED) MAGIC OUTPUT

.1191944+00	.0000000	.0000000	.0000000	.1342877+01	.0000000	.0000000	.0000000
.0000000	.7356324+05	-.1860215+05	-.5704850+03	.0000000	.9219030+00	-.5624532-01	.5601202-01
.0000000	-.1338627+05	.3275843+04	.1038109+03	.0000000	.7384783-01	.9975239+00	-.1019248-01
.0000000	-.4300239+03	.1052340+03	-.2171411+03	.0000000	.2372463-02	.6065524-01	.9241296+00
.5545511+00	.0000000	.0000000	.0000000	.2522729-05	.0000000	.0000000	.0000000
.0000000	.8641561+00	-.7421717-01	-.2351831-02	.0000000	.7584210-06	-.1981934-07	.2309055-06
.0000000	.4840953-01	.7424349+00	.5068280-01	.0000000	.1812595-07	-.1705754-06	-.7664657-05
.0000000	.4118167-01	-.1007784-01	.8660945+00	.0000000	-.2272069-06	-.8460817-05	-.2551830-03
.0000000	-.2260566+00	-.7606366+01	-.2400769+00	.0000000	-.5968492-07	.3849167-06	.2352558-04

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.6075007+06	.0000000	.0000000	.0000000	-.4523873+06	.0000000	.0000000	.0000000
FORCZ1	.0000000	.1301396+08	.2447386+07	-.3978021+06	.0000000	-.1301396+08	-.2414319+07	-.4388162+06
FORCR1	.0000000	.2447386+07	.1904616+07	-.8360868+05	.0000000	-.2447386+07	-.2016905+07	-.9348882+05
MOME 1	.0000000	-.3978021+06	-.8360868+05	.1634786+05	.0000000	.3978021+06	.8359467+05	.9009884+04
FORCT2	-.4523873+06	.0000000	.0000000	.0000000	.3368793+06	.0000000	.0000000	.0000000
FORCZ2	.0000000	-.1301396+08	-.2447386+07	.3978021+06	.0000000	.1301396+08	.2414319+07	.4388162+06
FORCR2	.0000000	-.2414319+07	-.2016905+07	.8359467+05	.0000000	.2414319+07	.2266665+07	.9391466+05
MOME 2	.0000000	-.4388162+06	-.9348882+05	.9009884+04	.0000000	.4388162+06	.9391466+05	.2008550+05

SEGMENT SYMMETRY CHECK

.6075007+06	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1301396+08	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1904616+07	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1634786+05	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.3368792+06	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1301396+08	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.2266665+07	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.2008550+05

SEGMENT LOAD MATRICES

.0000000
.5281456+01
.1017595+01
-.5637968-01
.0000000
.6123617+01
.1432160+01

.6727540-01

RZERO(I) = 1.816357-01 RZERO(J) = 2.439066-01

INPUT DATA FOR SEGMENT COUPLING

REGION NUMBER 2 NUMBER OF SEGMENT JOINTS 3 NUMBER OF KINEMATIC LINKS 0

SEGMENT	JOINT(I)	JOINT(J)
1	1	2
2	2	3

REGION STIFFNESS MATRIX

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.3708817+06	.0000000	.0000000	.0000000	-.1908921+06	.0000000	.0000000	.0000000
FORCZ1	.0000000	.1725417+07	.1963591+06	-.8926414+05	.0000000	-.1725417+07	-.1677271+06	-.1116004+06
FORCR1	.0000000	.1963591+06	.6320364+06	-.1512423+05	.0000000	-.1963591+06	-.6645688+06	-.2063800+05
MOME 1	.0000000	-.8926414+05	-.1512423+05	.6441501+04	.0000000	.8926414+05	.1488700+05	.3966312+04
FORCT2	-.1908921+06	.0000000	.0000000	.0000000	.9825195+05	.0000000	.0000000	.0000000
FORCZ2	.0000000	-.1725417+07	-.1963591+06	.8926414+05	.0000000	.1725417+07	.1677271+06	.1116004+06
FORCR2	.0000000	-.1677271+06	-.6645688+06	.1488700+05	.0000000	.1677271+06	.9962789+06	.2199959+05
MOME 2	.0000000	-.1116004+06	-.2063800+05	.3966312+04	.0000000	.1116004+06	.2199959+05	.1019914+05

REGION SYMMETRY CHECK

.3708817+06	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1725417+07	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.6320364+06	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.6441501+04	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.9825195+05	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1725417+07	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.9962789+06	.0000000

.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1019914+05

REGION LOAD MATRIX

.0000000
.7867053+01
.1154944+01
-.1536856+00
.0000000
.1095377+02
.2433576+01
.2283314+00

REGION NUMBER 3

THERE ARE 2 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 ELLIPSE SEGMENT

DTAU	DIFF	STEP	DELTA
.7000000-02	.1000000-03	.1400000-02	.0000000

GEOMETRY INPUT VARIABLES

.3000000+01	.3000000+01	.0000000

ISOT EPRE SING THIC NOTH T FREE = .000 NUMBER OF TABLE COLUMNS = 3

MATERIAL PROPERTY TABLE USED

.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.32500+06	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.40000+00	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000

TABLE ORDER PHI OR S VS. CROSSECTION PROPERTIES

.2400000+00	.2750000+00	.3100000+00
.1890000+00	.1890000+00	.1890000+00

PROBLEM 1 TABLE ORDER PHI OR S VS. DISTRIBUTED LOADS (F THETA, F PHI, F ZETA, M THETA, M PHI)

LOAD IDENTIFICATION CLUES 000100

.1370000+03	.1370000+03	.1370000+03

MATRIX X AND Y (TRANSPOSED) MAGIC OUTPUT

.2236538+00	.0000000	.0000000	.0000000	.1305961+01	.0000000	.0000000	.0000000
.0000000	.5003033+05	-.1602609+05	-.6203359+03	.0000000	.9247110+00	-.6542763-01	.7424162-01
.0000000	-.1224326+05	.3921852+04	.1518065+03	.0000000	.8776802-01	.9964461+00	-.1816816-01
.0000000	-.4773998+03	.1529243+03	-.1453495+03	.0000000	.3422919-02	.7408997-01	.9276950+00
.5863558+00	.0000000	.0000000	.0000000	.3108133-05	.0000000	.0000000	.0000000
.0000000	.8728296+00	-.8845823-01	-.3423639-02	.0000000	.9341546-06	-.2555994-07	.4097173-06
.0000000	.5794646-01	.7624763+00	.6298879-01	.0000000	.2386119-07	-.3122822-06	-.1157137-04
.0000000	.5573894-01	-.1785472-01	.8754181+00	.0000000	-.3996789-06	-.1265382-04	-.3144701-03
.0000000	-.3249206+00	-.9372061+01	-.3665531+00	.0000000	-.9918892-07	.8551966-06	.4302199-04

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.6439228+06	.0000000	.0000000	.0000000	-.4930645+06	.0000000	.0000000	.0000000
FORCZ1	.0000000	.9299041+07	.2166154+07	-.3511718+06	.0000000	-.9299041+07	-.2119671+07	-.3834031+06
FORCR1	.0000000	-.2166154+07	.2123487+07	-.9763943+05	.0000000	-.2166154+07	-.2238239+07	-.1086136+06
MOME 1	.0000000	-.3511718+06	-.9763943+05	.1794102+05	.0000000	.3511718+06	.9751383+05	.9798899+04
FORCT2	-.4930645+06	.0000000	.0000000	.0000000	.3775496+06	.0000000	.0000000	.0000000
FORCZ2	.0000000	-.9299041+07	-.2166154+07	.3511718+06	.0000000	.9299041+07	.2119671+07	.3834031+06
FORCR2	.0000000	-.2119671+07	-.2238239+07	.9751382+05	.0000000	.2119671+07	.2479632+07	.1091127+06
MOME 2	.0000000	-.3834031+06	-.1086136+06	.9798899+04	.0000000	.3834031+06	.1091127+06	.2161936+05

SEGMENT SYMMETRY CHECK

.6439228+06	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.9299040+07	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.2123487+07	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1794102+05	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.3775496+06	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.9299040+07	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.2479632+07	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.2161936+05

SEGMENT LOAD MATRICES

.0000000
.8449465+01
.2176780+01
-.1115372+00
.0000000
.9611152+01
.2951578+01

.1308946+00

RZERO(I) = 2.439066-01 RZERO(J) = 3.185169-01

SEGMENT NUMBER 2   SEGMENT CODE 11   ELLIPSE SEGMENT

DTAU	DIFF	STEP	DELTA
.8000000-02	.1000000-03	.1600000-02	.0000000

GEOMETRY INPUT VARIABLES

.3000000+01   .3000000+01   .0000000

ISOT   EPRE   SING   THIC   NOTH   T FREE =   .000   NUMBER OF TABLE COLUMNS = 3

MATERIAL PROPERTY TABLE USED

.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.32500+06	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.40000+00	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000

TABLE ORDER PHI OR S VS. CROSSECTION PROPERTIES

.3100000+00	.3500000+00	.3900000+00
.1890000+00	.1890000+00	.1890000+00

PROBLEM 1   TABLE ORDER PHI OR S VS. DISTRIBUTED LOADS (F THETA, F PHI, F ZETA, M THETA, M PHI)

LOAD IDENTIFICATION CLUES 000100

.1370000+03   .1370000+03   .1370000+03

MATRIX X AND Y (TRANSPOSED) MAGIC OUTPUT

.3778796+00	.0000000	.0000000	.0000000	.1278669+01	.0000000	.0000000	.0000000
.0000000	.3507948+05	-.1441959+05	-.6826624+03	.0000000	.9269551+00	-.7423995-01	.9969980-01
.0000000	-.1123692+05	.4618992+04	.2186755+03	.0000000	.1022885+00	.9949839+00	-.3193659-01
.0000000	-.5321237+03	.2187321+03	-.9787433+02	.0000000	.4845862-02	.9050041-01	.9305524+00
.6116658+00	.0000000	.0000000	.0000000	.3821503-05	.0000000	.0000000	.0000000
.0000000	.8793752+00	-.1035094+00	-.4899036-02	.0000000	.1148261-05	-.2973594-07	.7153840-06
.0000000	.6778698-01	.7774432+00	.7794553-01	.0000000	.2864823-07	-.5709727-06	-.1741882-04
.0000000	.7573193-01	-.3112998-01	.8825814+00	.0000000	-.6898077-06	-.1691374-04	-.3867392-03
.0000000	-.4564856+00	-.1152386+02	-.5407077+00	.0000000	-.1560842-06	.1900900-05	.7862236-04

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.6696322+06	.0000000	.0000000	.0000000	-.5236947+06	.0000000	.0000000	.0000000
FORCZ1	.0000000	.6441358+07	.1731011+07	-.2994898+06	.0000000	-.6441358+07	-.1670050+07	-.3240286+06
FORCR1	.0000000	.1731011+07	.2241876+07	-.1074827+06	.0000000	-.1731011+07	-.2355792+07	-.1193889+06
MOME 1	.0000000	-.2994898+06	-.1074827+06	.1915869+05	.0000000	.2994898+06	.1072099+06	.1039172+05
FORCT2	-.5236947+06	.0000000	.0000000	.0000000	.4095631+06	.0000000	.0000000	.0000000
FORCZ2	.0000000	-.6441358+07	-.1731011+07	.2994898+06	.0000000	.6441358+07	.1670050+07	.3240286+06
FORCR2	.0000000	-.1670050+07	-.2355792+07	.1072099+06	.0000000	.1670050+07	.2589283+07	.1200045+06
MOME 2	.0000000	-.3240286+06	-.1193889+06	.1039172+05	.0000000	.3240286+06	.1200045+06	.2274945+05

SEGMENT SYMMETRY CHECK

.6696322+06	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.6441358+07	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.2241876+07	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1915869+05	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.4095631+06	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.6441358+07	.0000000	.0000080
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.2589283+07	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.2274945+05

SEGMENT LOAD MATRICES

.0000000
.1308516+02
.4403342+01
-.2152850+00
.0000000
.1463222+02
.5777613+01

.2494787+00

RZERO(I) = 3.185169-01 RZERO(J) = 4.072498-01

INPUT DATA FOR SEGMENT COUPLING

REGION NUMBER 3 NUMBER OF SEGMENT JOINTS 3 NUMBER OF KINEMATIC LINKS 0

SEGMENT	JOINT(I)	JOINT(J)
1	1	2
2	2	3

REGION STIFFNESS MATRIX

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.4117639+06	.0000000	.0000000	.0000000	-.2465811+06	.0000000	.0000000	.0000000
FORCZ1	.0000000	.1042193+07	.8244002+05	-.7809098+05	.0000000	-.1042193+07	-.2612880+05	-.9112546+05
FORCR1	.0000000	.8244002+05	.7760444+06	-.2310934+05	.0000000	-.8244001+05	-.8307681+06	-.3144346+05
MOME 1	.0000000	-.7809098+05	-.2310934+05	.8486697+04	.0000000	.7809098+05	.2212762+05	.4987121+04
FORCT2	-.2465811+06	.0000000	.0000000	.0000000	.1476638+06	.0000000	.0000000	.0000000
FORCZ2	.0000000	-.1042193+07	-.8244001+05	.7809098+05	.0000000	.1042193+07	.2612880+05	.9112547+05
FORCR2	.0000000	-.2612880+05	-.8307681+06	.2212762+05	.0000000	.2612880+05	.1127615+07	.3344493+05
MOME 2	.0000000	-.9112546+05	-.3144346+05	.4987121+04	.0000000	.9112547+05	.3344493+05	.1212275+05

REGION SYMMETRY CHECK

.4117639+06	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1042193+07	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.7760444+06	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.8486697+04	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1476638+06	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1042193+07	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1127615+07	.0000000

.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1212275+05

REGION LOAD MATRIX

.0000000
.2015841+02
.5601525+01
-.5844616+00
.0000000
.2561961+02
.9633556+01
.7940032+00

REGION NUMBER 4

THERE ARE 2 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 ELLIPSE SEGMENT

DTAU	DIFF	STEP	DELTA
.9000000-02	.1000000-03	.1800000-02	.0000000

GEOMETRY INPUT VARIABLES

.3000000+01 .3000000+01 .0000000

ISOT EPRE SING THIC NOTH T FREE = .000 NUMBER OF TABLE COLUMNS = 3

MATERIAL PROPERTY TABLE USED

.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.32500+06	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.40000+00	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000

TABLE ORDER PHI OR S VS. CROSSECTION PROPERTIES

.3900000+00	.4350000+00	.4800000+00
.1890000+00	.1890000+00	.1890000+00

PROBLEM 1 TABLE ORDER PHI OR S VS. DISTRIBUTED LOADS (F THETA, F PHI, F ZETA, M THETA, M PHI)
LOAD IDENTIFICATION CLUES 000100

.1370000+03 .1370000+03 .1370000+03

MATRIX X AND Y (TRANSPOSED) MAGIC OUTPUT

.5770912+00	.0000000	.0000000	.0000000	.1259648+01	.0000000	.0000000	.0000000
.0000000	.2519122+05	-.1311482+05	-.7696308+03	.0000000	.9283388+00	-.8223423-01	.1389715+00
.0000000	-.1035497+05	.5390911+04	.3163605+03	.0000000	.1176716+00	.9928105+00	-.5712490-01
.0000000	-.6028237+03	.3138366+03	-.6306368+02	.0000000	.6856623-02	.1118511+00	.9322805+00
.6302933+00	.0000000	.0000000	.0000000	.4745516-05	.0000000	.0000000	.0000000
.0000000	.8836982+00	-.1197579+00	-.7023390-02	.0000000	.1425700-05	-.2740446-07	.1267809-05
.0000000	.7812441-01	.7872097+00	.9721464-01	.0000000	.2856009-07	-.1080707-05	-.2678228-04
.0000000	.1058143+00	-.5508807-01	.8872410+00	.0000000	-.1204106-05	-.2893598-04	-.4803561-03
.0000000	-.6381283+00	-.1431083+02	-.8292870+00	.0000000	-.2302015-06	.4433428-05	.1488162-03

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.6792141+06	.0000000	.0000000	.0000000	-.5392093+06	.0000000	.0000000	.0000000
FORCZ1	.0000000	.4242238+07	.1163257+07	-.2420061+06	.0000000	-.4242238+07	-.1086791+07	-.2593938+06
FORCR1	.0000000	.1163257+07	.2199387+07	-.1100099+06	.0000000	-.1163257+07	-.2308742+07	-.1225897+06
MOME 1	.0000000	-.2420061+06	-.1100099+06	.1980369+05	.0000000	.2420061+06	.1095288+06	.1068713+05
FORCT2	-.5392093+06	.0000000	.0000000	.0000000	.4280648+06	.0000000	.0000000	.0000000
FORCZ2	.0000000	-.4242238+07	-.1163257+07	.2420061+06	.0000000	.4242238+07	.1086791+07	.2593938+06
FORCR2	.0000000	-.1086791+07	-.2308742+07	.1095288+06	.0000000	.1086791+07	.2534459+07	.1233920+06
MOME 2	.0000000	-.2593938+06	-.1225897+06	.1068713+05	.0000000	.2593938+06	.1233920+06	.2327095+05

SEGMENT SYMMETRY CHECK

.6792141+06	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.4242238+07	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.2199387+07	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1980369+05	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.4280648+06	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.4242238+07	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.2534459+07	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.2327095+05

SEGMENT LOAD MATRICES

.0000000
.1992380+02
.8594535+01
-.4178731+00
.0000000
.2193656+02
.1097598+02

.4799210+00

RZERO(I) = 4.072498-01 RZERO(J) = 5.129445-01

```
        SEGMENT NUMBER  2     SEGMENT CODE 11      ELLIPSE SEGMENT

                DTAU              DIFF               STEP          DELTA

             .1000000-01       .1000000-03        .2000000-02      .0000000

                                              GEOMETRY INPUT VARIABLES

                             .3000000+01        .3000000+01        .0000000

       ISOT      EPRE      SING      THIC      NOTH      T FREE =    .000           NUMBER OF TABLE COLUMNS =  3

                                              MATERIAL PROPERTY TABLE USED

   .00000      .00000      .00000      .00000      .00000      .00000      .00000      .00000      .00000      .00000
   .32500+06   .00000      .00000      .00000      .00000      .00000      .00000      .00000      .00000      .00000
   .40000+00   .00000      .00000      .00000      .00000      .00000      .00000      .00000      .00000      .00000
   .00000      .00000      .00000      .00000      .00000      .00000      .00000      .00000      .00000      .00000

                                   TABLE ORDER PHI OR S VS. CROSSECTION PROPERTIES
   .4800000+00    .5300000+00    .5800000+00
   .1890000+00    .1890000+00    .1890000+00

            PROBLEM  1     TABLE ORDER  PHI OR S VS. DISTRIBUTED LOADS (F THETA, F PHI, F ZETA, M THETA, M PHI)
 LOAD IDENTIFICATION CLUES 000100

   .1370000+03    .1370000+03    .1370000+03

                                       MATRIX X AND Y (TRANSPOSED)  MAGIC OUTPUT
   .7952555+00   .0000000      .0000000      .0000000      .1248005+01   .0000000      .0000000      .0000000
   .0000000      .1839195+05  -.1204983+05  -.8992788+03   .0000000      .9286815+00  -.8829154-01   .2058839+00
   .0000000     -.9575049+04   .6273270+04   .4681743+03   .0000000      .1343617+00   .9889953+00  -.1071854+00
   .0000000     -.7018986+03   .4598618+03  -.3224957+02   .0000000      .9868336-02   .1415174+00   .9318123+00
   .6421269+00   .0000000      .0000000      .0000000      .6023490-05   .0000000      .0000000      .0000000
   .0000000      .8856852+00  -.1378656+00  -.1027495-01   .0000000      .1810050-05  -.2494994-08   .2350810-05
   .0000000      .8960314-01   .7910801+00   .1236753+00   .0000000      .1075723-07  -.2195021-05  -.4308244-04
   .0000000      .1555943+00  -.1019405+00   .8885372+00   .0000000     -.2189687-05  -.4640594-04  -.6097646-03
   .0000000     -.9035593+00  -.1816323+02  -.1332241+01   .0000000     -.2859474-06   .1138097-04   .3024048-03
```

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.6677568+06	.0000000	.0000000	.0000000	-.5350594+06	.0000000	.0000000	.0000000
FORCZ1	.0000000	.2658315+07	.5490843+06	-.1816563+06	.0000000	-.2658315+07	-.4562875+06	-.1921163+06
FORCR1	.0000000	.5490843+06	.1964752+07	-.1030286+06	.0000000	-.5490843+06	-.2065205+07	-.1159651+06
MOME 1	.0000000	-.1816563+06	-.1030286+06	.1969990+05	.0000000	.1816563+06	.1022261+06	.1059248+05
FORCT2	-.5350594+06	.0000000	.0000000	.0000000	.4287343+06	.0000000	.0000000	.0000000
FORCZ2	.0000000	-.2658315+07	-.5490843+06	.1816563+06	.0000000	.2658315+07	.4562875+06	.1921163+06
FORCR2	.0000000	-.4562875+06	-.2065205+07	.1022261+06	.0000000	.4562875+06	.2283067+07	.1170803+06
MOME 2	.0000000	-.1921163+06	-.1159651+06	.1059248+05	.0000000	.1921163+06	.1170803+06	.2299979+05

SEGMENT SYMMETRY CHECK

.6677568+06	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.2658315+07	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1964752+07	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1969990+05	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.4287343+06	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.2658315+07	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.2283067+07	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.2299979+05

SEGMENT LOAD MATRICES

.0000000
.3025195+02
.1655256+02
-.8403206+00
.0000008
.3284150+02
.2064475+02

.9597337+00

RZERO(I) = 5.129445-01 RZERO(J) = 6.400822-01

INPUT DATA FOR SEGMENT COUPLING

REGION NUMBER 4 NUMBER OF SEGMENT JOINTS 3 NUMBER OF KINEMATIC LINKS 0

SEGMENT	JOINT(I)	JOINT(J)
1	1	2
2	2	3

REGION STIFFNESS MATRIX

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.4138911+06	.0000000	.0000000	.0000000	-.2632810+06	.0000000	.0000000	.0000000
FORCZ1	.0000000	.5693219+06	-.1374452+06	-.5231184+05	.0000000	-.5693218+06	.2251325+06	-.5521432+05
FORCR1	.0000000	-.1374462+06	.7182301+06	-.2296168+05	.0000000	.1374453+06	-.7654291+06	-.3423194+05
MOME 1	.0000000	-.5231184+05	-.2296168+05	.9158445+04	.0000000	.5231184+05	.2041335+05	.5219634+04
FORCT2	-.2632810+06	.0000000	.0000000	.0000000	.1674796+06	.0000000	.0000000	.0000000
FORCZ2	.0000000	-.5693218+06	.1374453+06	.5231184+05	.0000000	.5693218+06	-.2251325+06	.5521432+05
FORCR2	.0000000	.2251325+06	-.7654291+06	.2041335+05	.0000000	-.2251325+06	.1042775+07	.3795437+05
MOME 2	.0000000	-.5521432+05	-.3423194+05	.5219634+04	.0000000	.5521432+05	.3795437+05	.1255887+05

REGION SYMMETRY CHECK

.4138911+06	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.5693219+06	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.7182301+06	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.9158445+04	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1674796+06	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.5693218+06	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1042775+07	.0000000

.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1255887+05

REGION LOAD MATRIX

```
 .0000000
 .4750450+02
 .2242327+02
-.2260291+01
 .0000000
 .5744931+02
 .3376806+02
 .2962609+01
```

REGION NUMBER 5'

THERE ARE 2 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 ELLIPSE SEGMENT

DTAU	DIFF	STEP	DELTA
.1000000-01	.1000000-03	.2000000-02	.0000000

GEOMETRY INPUT VARIABLES

.3000000+01	.3000000+01	.0000000

ISOT EPRE STNG THIC NOTH T FREE = .000 NUMBER OF TABLE COLUMNS = 3

MATERIAL PROPERTY TABLE USED

.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.32500+06	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.40000+00	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000

TABLE ORDER PHI OR S VS. CROSSECTION PROPERTIES

.5800000+00	.6300000+00	.6800000+00
.1890000+00	.1890000+00	.1890000+00

PROBLEM 1 TABLE ORDER PHI OR S VS. DISTRIBUTED LOADS (F THETA, F PHI, F ZETA, M THETA, M PHI)

LOAD IDENTIFICATION CLUES 000100

.1370000+03	.1370000+03	.1370000+03

MATRIX X AND Y (TRANSPOSED) MAGIC OUTPUT

.8948880+00	.0000000	.0000000	.0000000	.1219989+01	.0000000	.0000000	.0000000
.0000000	.1263937+05	-.1022097+05	-.9060425+03	.0000000	.9329299+00	-.8541923-01	.2456608+00
.0000000	-.8280918+04	.6690459+04	.5936105+03	.0000000	.1405025+00	.9855604+00	-.1609492+00
.0000000	-.7145513+03	.5770301+03	-.3817663+01	.0000000	.1216486-01	.1677336+00	.9332868+00
.6719661+00	.0000000	.0000000	.0000000	.7192973-05	.0000000	.0000000	.0000000
.0000000	.8941962+00	-.1453273+00	-.1285088-01	.0000000	.2162840-05	.4715073-07	.3480087-05
.0000000	.9342449-01	.8063231+00	.1486318+00	.0000000	-.2785858-07	-.3666930-05	-.6109812-04
.0000000	.1872172+00	-.1513953+00	.8945865+00	.0000000	-.3192654-05	-.6531396-04	-.7277708-03
.0000000	-.1085056+01	-.2168034+02	-.1882027+01	.0000000	-.2017448-06	.2242021-04	.5049953-03

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.6821238+06	.0000000	.0000000	.0000000	-.5591228+06	.0000000	.0000000	.0000000
FORCZ1	.0000000	.2089629+07	.2104068+06	-.1517861+06	.0000000	-.2089629+07	-.1017695+06	-.1569814+06
FORCR1	.0000000	.2104068+06	.1870240+07	-.1061276+06	.0000000	-.2104068+06	-.1962720+07	-.1193268+06
MOME 1	.0000000	-.1517861+06	-.1061276+06	.2072579+05	.0000000	.1517861+06	.1050311+06	.1105348+05
FORCT2	-.5591228+06	.0000000	.0000000	.0000000	.4583051+06	.0000000	.0000000	.0000000
FORCZ2	.0000000	-.2089629+07	-.2104068+06	.1517861+06	.0000000	.2089629+07	.1017695+06	.1569814+06
FORCR2	.0000000	-.1017695+06	-.1962720+07	.1050311+06	.0000000	.1017695+06	.2167803+07	.1206965+06
MOME 2	.0000000	-.1569814+06	-.1193268+06	.1105348+05	.0000000	.1569814+06	.1206965+06	.2381743+05

SEGMENT SYMMETRY CHECK

.6821238+06	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.2089629+07	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1870240+07	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.2072579+05	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.4583051+06	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.2089629+07	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.2167803+07	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.2381743+05

SEGMENT LOAD MATRICES

.0000000
.4166008+02
.2864040+02
-.1457899+01
.0000000
.4439037+02
.3445096+02

.1642554+01

RZERO(I) = 6.400822-01 RZERO(J) = 7.807928-01

SEGMENT NUMBER 2 SEGMENT CODE 11 ELLIPSE SEGMENT

DTAU	DIFF	STEP	DELTA
.1000000-01	.1000000-03	.2000000-02	.0000000

GEOMETRY INPUT VARIABLES

.3000000+01 .3000000+01 .0000000

ISOT EPRE SING THIC NOTH T FREE = .000 NUMBER OF TABLE COLUMNS = 3

MATERIAL PROPERTY TABLE USED

.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.32500+06	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.40000+00	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000

TABLE ORDER PHI OR S VS. CROSSECTION PROPERTIES

.6800000+00	.7300000+00	.7800000+00
.1890000+00	.1890000+00	.1890000+00

PROBLEM 1 TABLE ORDER PHI OR S VS. DISTRIBUTED LOADS (F THETA, F PHI, F ZETA, M THETA, M PHI)
LOAD IDENTIFICATION CLUES 000100

.1370000+03	.1370000+03	.1370000+03

MATRIX X AND Y (TRANSPOSED) MAGIC OUTPUT

.9108530+00	.0000000	.0000000	.0000000	.1203427+01	.0000000	.0000000	.0000000
.0000000	.8995429+04	-.8898832+04	-.9703103+03	.0000000	.9356701+00	-.7895460-01	.3225993+00
.0000000	-.7274256+04	.7196141+04	.7846525+03	.0000000	.1478146+00	.9781203+00	-.2608736+00
.0000000	-.7652589+03	.7570412+03	.2785665+02	.0000000	.1563745-01	.2053470+00	.9294913+00
.6905953+00	.0000000	.0000000	.0000000	.8854065-05	.0000000	.0000000	.0000000
.0000000	.8971655+00	-.1544377+00	-.1676987-01	.0000000	.2665905-05	.1715677-06	.5563994-05
.0000000	.9909525-01	.8109677+00	.1834661+00	.0000000	-.1274208-06	-.6760511-05	-.9224849-04
.0000000	.2451316+00	-.2424993+00	.8936699+00	.0000000	-.5022963-05	-.9816841-04	-.8947540-03
.0000000	-.1356673+01	-.2665903+02	-.2835490+01	.0000000	.2551910-06	.5051264-04	.9310837-03

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.6667955+06	.0000000	.0000000	.0000000	-.5540807+06	.0000000	.0000000	.0000000
FORCZ1	.0000000	.1635032+07	-.1359328+06	-.1152132+06	.0000000	-.1635032+07	.2591380+06	-.1150238+06
FORCR1	.0000000	-.1359328+06	.1572483+07	-.9690392+05	.0000000	.1359328+06	-.1652489+07	-.1097730+06
MOME 1	.0000000	-.1152132+06	-.9690392+05	.2063281+05	.0000000	.1152132+06	.9535692+05	.1093562+05
FORCT2	-.5540807+06	.0000000	.0000000	.0000000	.4604236+06	.0000000	.0000000	.0000000
FORCZ2	.0000000	-.1635032+07	.1359328+06	.1152132+06	.0000000	.1635032+07	-.2591381+06	.1150238+06
FORCR2	.0000000	.2591381+06	-.1652489+07	.9535692+05	.0000000	-.2591381+06	.1846235+07	.1115783+06
MOME 2	.0000000	-.1150238+06	-.1097730+06	.1093562+05	.0000000	.1150238+06	.1115783+06	.2348584+05

SEGMENT SYMMETRY CHECK

.6667955+06	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1635032+07	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1572483+07	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.2063281+05	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.4604236+06	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1635032+07	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1846235+07	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.2348584+05

SEGMENT LOAD MATRICES

.0000000
.5724790+02
.4870958+02
-.2653773+01
.0000000
.6026055+02
.5699222+02

.2965448+01

RZERO(I) = 7.807928-01 RZERO(J) = 9.394999-01

INPUT DATA FOR SEGMENT COUPLING

REGION NUMBER 5 NUMBER OF SEGMENT JOINTS 3 NUMBER OF KINEMATIC LINKS 0

SEGMENT	JOINT(I)	JOINT(J)
1	1	2
2	2	3

REGION STIFFNESS MATRIX

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.4042656+06	.0000000	.0000000	.0000000	-.2753524+06	.0000000	.0000000	.0000000
FORCZ1	.0000000	.5111760+06	-.2870373+06	-.3694372+05	.0000000	-.5111759+06	.4044125+06	-.2890837+05
FORCR1	.0000000	-.2870373+06	.5782333+06	-.2103623+05	.0000000	.2870374+06	-.6068520+06	-.3392624+05
MOME 1	.0000000	-.3694372+05	-.2103623+05	.9799328+04	.0000000	.3694371+05	.1601049+05	.5282746+04
FORCT2	-.2753524+06	.0000000	.0000000	.0000000	.1875543+06	.0000000	.0000000	.0000000
FORCZ2	.0000000	-.5111759+06	.2870374+06	.3694371+05	.0000000	.5111760+06	-.4044125+06	.2890837+05
FORCR2	.0000000	.4044125+06	-.6068520+06	.1601049+05	.0000000	-.4044125+06	.8575342+06	.4023139+05
MOME 2	.0000000	-.2890837+05	-.3392624+05	.5282746+04	.0000000	.2890837+05	.4023139+05	.1282769+05

REGION SYMMETRY CHECK

.4042656+06	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.5111760+06	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.5782333+06	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.9799328+04	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1875543+06	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.5111760+06	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.8575342+06	.0000000

.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1282769+06

REGION LOAD MATRIX

.0000000
.9323790+02
.7214607+02
-.7460079+01
.0000000
.1103210+03
.9336352+02
.9391885+01

REGION NUMBER 6

THERE ARE 2 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 ELLIPSE SEGMENT

DTAU	DIFF	STEP	DELTA
.1000000-01	.1000000-03	.2000000-02	.0000000

GEOMETRY INPUT VARIABLES

.3000000+01	.3000000+01	.0000000

ISOT EPRE SING THIC NOTH T FREE = .000 NUMBER OF TABLE COLUMNS = 3

MATERIAL PROPERTY TABLE USED

.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.32500+06	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.40000+00	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000

TABLE ORDER PHI OR S VS. CROSSECTION PROPERTIES

.7800000+00	.8300000+00	.8800000+00
.1890000+00	.1890000+00	.1890000+00

PROBLEM 1 TABLE ORDER PHI OR S VS. DISTRIBUTED LOADS (F THETA, F PHI, F ZETA, M THETA, M PHI)

LOAD IDENTIFICATION CLUES 000100

.1370000+03	.1370000+03	.1370000+03

MATRIX X AND Y (TRANSPOSED) MAGIC OUTPUT

.8435881+00	.0000000	.0000000	.0000000	.1194303+01	.0000000	.0000000	.0000000
.0000000	.6510645+04	-.7875693+04	-.1097846+04	.0000000	.9373574+00	-.6441382-01	.4647493+00
.0000000	-.6440730+04	.7791120+04	.1086057+04	.0000000	.1568611+00	.9599649+00	-.4597586+00
.0000000	-.8584492+03	.1038435+04	.7642432+02	.0000000	.2109314-01	.2600823+00	.9144426+00
.7011892+00	.0000000	.0000000	.0000000	.1127741-04	.0000000	.0000000	.0000000
.0000000	.9013530+00	-.1659977+00	-.2298712-01	.0000000	.3405696-05	.5051503-06	.9699100-05
.0000000	.1098435+00	.8014967+00	.2334081+00	.0000000	-.3968664-06	-.1388222-04	-.1492826-03
.0000000	.3488335+00	-.4219714+00	.8807392+00	.0000000	-.8608566-05	-.1584713-03	-.1136029-02
.0000000	-.1795196+01	-.3385880+02	-.4584243+01	.0000000	.2191672-05	.1316648-03	.1912548-02

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.6251462+06	.0000000	.0000000	.0000000	-.5234403+06	.0000000	.0000000	.0000000
FORCZ1	.0000000	.1343812+07	-.3773246+06	-.8030808+05	.0000000	-.1343812+07	.5136437+06	-.7454203+05
FORCR1	.0000000	-.3773246+06	.1172500+07	-.7909372+05	.0000000	.3773246+06	-.1235813+07	-.9116118+05
MOME 1	.0000000	-.8030808+05	-.7909372+05	.1956137+05	.0000000	.8030808+05	.7680978+05	.1029794+05
FORCT2	-.5234403+06	.0000000	.0000000	.0000000	.4382860+06	.0000000	.0000000	.0000000
FORCZ2	.0000000	-.1343812+07	.3773246+06	.8030808+05	.0000000	.1343812+07	-.5136437+06	.7454203+05
FORCR2	.0000000	.5136437+06	-.1235813+07	.7680978+05	.0000000	-.5136437+06	.1419514+07	.9371545+05
MOME 2	.0000000	-.7454203+05	-.9116118+05	.1029794+05	.0000000	.7454203+05	.9371545+05	.2214898+05

SEGMENT SYMMETRY CHECK

.6251462+06	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1343812+07	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1172500+07	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1956137+05	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.4382860+06	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1343812+07	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1419514+07	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.2214898+05

SEGMENT LOAD MATRICES

.0000000
.7896926+02
.8295788+02
-.5135244+01
.0000000
.8285487+02
.9476795+02

.5712242+01

RZERO(I) =   9.394999-01   RZERO(J) =   1.121894+00

SEGMENT NUMBER 2 SEGMENT CODE 11 ELLIPSE SEGMENT

DTAU	DIFF	STEP	DELTA
.1000000-01	.1000000-03	.2000000-02	.0000000

GEOMETRY INPUT VARIABLES

.3000000+01	.3000000+01	.0000000

ISOT EPRE SING THIC NOTH T FREE = .000 NUMBER OF TABLE COLUMNS = 3

MATERIAL PROPERTY TABLE USED

.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.32500+06	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.40000+00	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000

TABLE ORDER PHI OR S VS. CROSSECTION PROPERTIES

.8800000+00	.9300000+00	.9800000+00
.1890000+00	.1890000+00	.1890000+00

PROBLEM 1 TABLE ORDER PHI OR S VS. DISTRIBUTED LOADS (F THETA, F PHI, F ZETA, M THETA, M PHI)

LOAD IDENTIFICATION CLUES 000100

.1370000+03	.1370000+03	.1370000+03

MATRIX X AND Y (TRANSPOSED) MAGIC OUTPUT

.7104624+00	.0000000	.0000000	.0000000	.1190251+01	.0000000	.0000000	.0000000
.0000000	.4699622+04	-.7006940+04	-.1304982+04	.0000000	.9387480+00	-.2937422-01	.7328765+00
.0000000	-.5684964+04	.8476044+04	.1578590+04	.0000000	.1678845+00	.9097722+00	-.8865345+00
.0000000	-.1003057+04	.1495516+04	.1695993+03	.0000000	.3002774-01	.3402659+00	.8684113+00
.7059693+00	.0000000	.0000000	.0000000	.1491230-04	.0000000	.0000000	.0000000
.0000000	.9009343+00	-.1805938+00	-.3329475-01	.0000000	.4535207-05	.1485131-05	.1860444-04
.0000000	.1339042+00	.7614987+00	.3059347+00	.0000000	-.1187916-05	-.3200691-04	-.2602076-03
.0000000	.5384190+00	-.8027603+00	.8375015+00	.0000000	-.1622425-04	-.2759418-03	-.1488162-02
.0000000	-.2597481+01	-.4439076+02	-.7990661+01	.0000000	.1046211-04	.4013505-03	.4412129-02

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.5626336+06	.0000000	.0000000	.0000000	-.4727016+06	.0000000	.0000000	.0000000
FORCZ1	.0000000	.1174658+07	-.4684738+06	-.5268118+05	.0000000	-.1174658+07	.6160952+06	-.4082701+05
FORCR1	.0000000	-.4684738+06	.7782717+06	-.5795736+05	.0000000	.4684738+06	-.8204083+06	-.6872797+05
MOME 1	.0000000	-.5268118+05	-.5795736+05	.1774718+05	.0000000	.5268118+05	.5439629+05	.9227833+04
FORCT2	-.4727016+06	.0000000	.0000000	.0000000	.3971495+06	.0000000	.0000000	.0000000
FORCZ2	.0000000	-.1174658+07	.4684738+06	.5268118+05	.0000000	.1174658+07	-.6160952+06	.4082701+05
FORCR2	.0000000	.6160953+06	-.8204083+06	.5439629+05	.0000000	-.6160953+06	.9956031+06	.7261042+05
MOME 2	.0000000	-.4082701+05	-.6872797+05	.9227833+04	.0000000	.4082701+05	.7261042+05	.2004832+05

SEGMENT SYMMETRY CHECK

.5626335+06	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1174658+07	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.7782717+06	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1774718+05	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.3971495+06	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1174658+07	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.9956031+06	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.2004832+05

SEGMENT LOAD MATRICES

.0000000
.1090866+03
.1433619+03
-.1066479+02
.0000000
.1164436+03
.1597348+03

```
.1183977+02
RZERO(I) =     1.121894+00          RZERO(J) =     1.335159+00
```

INPUT DATA FOR SEGMENT COUPLING

REGION NUMBER 6 NUMBER OF SEGMENT JOINTS 3 NUMBER OF KINEMATIC LINKS 0

SEGMENT	JOINT(I)	JOINT(J)
1	1	2
2	2	3

REGION STIFFNESS MATRIX

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.3514682+06	.0000000	.0000000	.0000000	-.2472037+06	.0000000	.0000000	.0000000
FORCZ1	.0000000	.5251861+06	-.2922676+06	-.2554949+05	.0000000	-.5251861+06	.4278875+06	-.3385135+04
FORCR1	.0000000	-.2922676+06	.3436294+06	-.1402766+05	.0000000	.2922676+06	-.3292695+06	-.2419607+05
MOME 1	.0000000	-.2554949+05	-.1402766+05	.9303206+04	.0000000	.2554949+05	.3527356+04	.4245816+04
FORCT2	-.2472037+06	.0000000	.0000000	.0000000	.1739080+06	.0000000	.0000000	.0000000
FORCZ2	.0000000	-.5251861+06	.2922676+06	.2554949+05	.0000000	.5251861+06	-.4278875+06	.3385136+04
FORCR2	.0000000	.4278875+06	-.3292695+06	.3527356+04	.0000000	-.4278875+06	.5560002+06	.3647774+05
MOME 2	.0000000	-.3385135+04	-.2419607+05	.4245816+04	.0000000	.3385136+04	.3647774+05	.1192568+05

REGION SYMMETRY CHECK

.3514082+06	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.5251861+06	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.3436294+06	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.9303206+04	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1739080+06	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.5251861+06	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.5560002+06	.0000000

```
 .1000000+01   .1000000+01   .1000000+01   .1000000+01   .1000000+01   .1000000+01   .1000000+01   .1192568+05

                                        REGION LOAD MATRIX

 .0000000
 .1600663+03
 .2169037+03
-.2733386+02
 .0000000
 .2272880+03
 .2361606+03
 .3384885+02
```

REGION NUMBER 7

THERE ARE 2 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1   SEGMENT CODE 11   ELLIPSE SEGMENT

DTAU	DIFF	STEP	DELTA
.8000000-02	.1000000-03	.1600000-02	.0000000

GEOMETRY INPUT VARIABLES

.3000000+01	.3000000+01	.0000000

ISOT   EPRE   SING   THIC   NOTH   T FREE = .000   NUMBER OF TABLE COLUMNS = 3

MATERIAL PROPERTY TABLE USED

.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.32500+06	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.40000+00	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000

TABLE ORDER PHI OR S VS. CROSSECTION PROPERTIES

.9800000+00	.1020000+01	.1060000+01
.1890000+00	.1890000+00	.1890000+00

PROBLEM 1   TABLE ORDER PHI OR S VS. DISTRIBUTED LOADS (F THETA, F PHI, F ZETA, M THETA, M PHI)
LOAD IDENTIFICATION CLUES 000100

.1370000+03	.1370000+03	.1370000+03

MATRIX X AND Y (TRANSPOSED) MAGIC OUTPUT

.4547791+00	.0000000	.0000000	.0000000	.1148765+01	.0000000	.0000000	.0000000
.0000000	.2848361+04	-.5082686+04	-.1003723+04	.0000000	.9495027+00	-.1973937-01	.5976182+00
.0000000	-.4246787+04	.7578072+04	.1496509+04	.0000000	.1504356+00	.9070828+00	-.8910238+00
.0000000	-.7977034+03	.1423442+04	.1769590+03	.0000000	.2867935-01	.3635400+00	.8715520+00
.7578517+00	.0000000	.0000000	.0000000	.1612950-04	.0000000	.0000000	.0000000
.0000000	.9194286+00	-.1616973+00	-.3156221-01	.0000000	.4899466-05	.1621308-05	.1868355-04
.0000000	.1140591+00	.7884187+00	.3341870+00	.0000000	-.1344702-05	-.3911374-04	-.3008323-03
.0000000	.4566527+00	-.8148624+00	.8476224+00	.0000000	-.1653504-04	-.3151864-03	-.1605794-02
.0000000	-.2300637+01	-.4791540+02	-.9177740+01	.0000000	.1292391-04	.5187243-03	.5381928-02

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.5974796+06	.0000000	.0000000	.0000000	-.5201062+06	.0000000	.0000000	.0000000
FORCZ1	.0000000	.1378365+07	-.5008092+06	-.4935331+05	.0000000	-.1378365+07	.6573316+06	-.3540053+05
FORCR1	.0000000	-.5008092+06	.7283807+06	-.6502017+05	.0000000	.5008092+06	-.7629487+06	-.7424207+05
MOME 1	.0000000	-.4935331+05	-.6502017+05	.1976418+05	.0000000	.4935331+05	.6140631+05	.1016012+05
FORCT2	-.5201062+06	.0000000	.0000000	.0000000	.4527565+06	.0000000	.0000000	.0000000
FORCZ2	.0000000	-.1378365+07	.5008092+06	.4935331+05	.0000000	.1378365+07	-.6573316+06	.3540053+05
FORCR2	.0000000	.6573316+06	-.7629487+06	.6140631+05	.0000000	-.6573316+06	.9186483+06	.7808755+05
MOME 2	.0000000	-.3540053+05	-.7424207+05	.1016012+05	.0000000	.3540053+05	.7808755+05	.2177891+05

SEGMENT SYMMETRY CHECK

.5974796+06	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1378365+07	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.7283807+06	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1976418+05	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.4527565+06	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1378365+07	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.9186483+06	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.2177891+05

SEGMENT LOAD MATRICES

.0000000
.1187409+03
.1917888+03
-.1420998+02
.0000000
.1263194+03
.2074742+03

.1544363+02

RZERO(I) = 1.335159+00 RZERO(J) = 1.533633+00

SEGMENT NUMBER 2   SEGMENT CODE 11   ELLIPSE SEGMENT

DTAU	DIFF	STEP	DELTA
.8000000-02	.1000000-03	.1600000-02	.0000000

GEOMETRY INPUT VARIABLES

.3000000+01   .3000000+01   .0000000

ISOT   EPRE   SING   THIC   NOTH   T FREE = .000   NUMBER OF TABLE COLUMNS = 3

MATERIAL PROPERTY TABLE USED

.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.32500+06	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.40000+00	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000

TABLE ORDER PHI OR S VS. CROSSECTION PROPERTIES

.1060000+01	.1100000+01	.1140000+01
.1890000+00	.1890000+00	.1890000+00

PROBLEM 1   TABLE ORDER PHI OR S VS. DISTRIBUTED LOADS (F THETA, F PHI, F ZETA, M THETA, M PHI)

LOAD IDENTIFICATION CLUES 000100

.1370000+03   .1370000+03   .1370000+03

MATRIX X AND Y (TRANSPOSED) MAGIC OUTPUT

.3399018+00	.0000000	.0000000	.0000000	.1148596+01	.0000000	.0000000	.0000000
.0000000	.2085032+04	-.4536770+04	-.1212913+04	.0000000	.9513734+00	.4663533-01	.9632708+00
.0000000	-.3720583+04	.6095525+04	.2164352+04	.0000000	.1609781+00	.7709827+00	-.1718884+01
.0000000	-.9409148+03	.2047313+04	.3500355+03	.0000000	.4154195-01	.4683078+00	.7429429+00
.7580678+00	.0000000	.0000000	.0000000	.2135931-04	.0000000	.0000000	.0000000
.0000000	.9167140+00	-.1757487+00	-.4625165-01	.0000000	.6577163-05	.4438904-05	.3645153-04
.0000000	.1599194+00	.6713590+00	.4306067+00	.0000000	-.3693182-05	-.9062487-04	-.5233536-03
.0000000	.7165008+00	-.1559016+01	.7247958+00	.0000000	-.3193129-04	-.5483272-03	-.2069626-02
.0000000	-.3679222+01	-.6187705+02	-.1597844+02	.0000000	.4953700-04	.1596261-02	.1247735-01

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.5181809+06	.0000000	.0000000	.0000000	-.4511430+06	.0000000	.0000000	.0000000
FORCZ1	.0000000	.1237023+07	-.4362396+06	-.3392930+05	.0000000	-.1237023+07	.5985083+06	-.1397794+05
FORCR1	.0000000	-.4362396+06	.4397796+06	-.4439948+05	.0000000	.4362396+06	-.4518297+06	-.5147941+05
MOME 1	.0000000	-.3392930+05	-.4439948+05	.1730887+05	.0000000	.3392930+05	.3876854+05	.8656652+04
FORCT2	-.4511430+06	.0000000	.0000000	.0000000	.3927811+06	.0000000	.0000000	.0000000
FORCZ2	.0000000	-.1237023+07	.4362396+06	.3392930+05	.0000000	.1237023+07	-.5985083+06	.1397794+05
FORCR2	.0000000	.5985083+06	-.4518297+06	.3876854+05	.0000000	-.5985083+06	.6026970+06	.5742350+05
MOME 2	.0000000	-.1397794+05	-.5147941+05	.8656652+04	.0000000	.1397794+05	.5742350+05	.1907196+05

SEGMENT SYMMETRY CHECK

.5181809+06	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1237023+07	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.4397796+06	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1730887+05	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.3927811+06	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1237023+07	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.6026970+06	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1907196+05

SEGMENT LOAD MATRICES

.0000000
.1496465+03
.3067608+03
-.2843944+02
.0000000
.1731169+03
.3245239+03

.3091252+02

RZERO(I) = 1.533633+00 RZERO(J) = 1.761367+00

INPUT DATA FOR SEGMENT COUPLING

REGION NUMBER 7 NUMBER OF SEGMENT JOINTS 3 NUMBER OF KINEMATIC LINKS 0

SEGMENT	JOINT(I)	JOINT(J)
1	1	2
2	2	3

REGION STIFFNESS MATRIX

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.3188721+06	.0000000	.0000000	.0000000	-.2416657+06	.0000000	.0000000	.0000000
FORCZ1	.0000000	.6070220+06	-.2404701+06	-.2372103+05	.0000000	-.6070220+06	.3795599+06	.8611150+04
FORCR1	.0000000	-.2404701+06	.2168421+06	-.1415916+05	.0000000	.2404701+06	-.1731941+06	-.1718891+05
MOME 1	.0000000	-.2372103+05	-.1415916+05	.1006334+05	.0000000	.2372103+05	-.1496378+04	.3470195+04
FORCT2	-.2416657+06	.0000000	.0000000	.0000000	.1831590+06	.0000000	.0000000	.0000000
FORCZ2	.0000000	-.6070220+06	.2404701+06	.2372103+05	.0000000	.6070220+06	-.3795599+06	-.8611148+04
FORCR2	.0000000	.3795599+06	-.1731941+06	-.1496378+04	.0000000	-.3795599+06	.3643826+06	.3456373+05
MOME 2	.0000000	.8611150+04	-.1718891+05	.3470195+04	.0000000	-.8611148+04	.3456373+05	.1223693+05

REGION SYMMETRY CHECK

.3188721+06	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.6070220+06	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.2168421+06	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1006334+05	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1831590+06	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.6070220+06	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.3643826+06	.0000000

.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1223693+05

REGION LOAD MATRIX

.0000000
.1706396+03
.4731859+03
-.6986271+02
.0000000
.3973841+03
.4474790+03
.8310151+02

REGION NUMBER 6

THERE ARE 2 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION.

SEGMENT NUMBER 1 SEGMENT CODE 11 ELLIPSE SEGMENT

DTAU	DIFF	STEP	DELTA
.8000000-02	.1000000-03	.1600000-02	.0000000

GEOMETRY INPUT VARIABLES

.3000000+01	.3000000+01	.0000000

ISOT EPRE SING THIC NOTH T FREE = .000 NUMBER OF TABLE COLUMNS = 3

MATERIAL PROPERTY TABLE USED

.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.32500+06	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.40000+00	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000

TABLE ORDER PHI OR S VS. CROSSECTION PROPERTIES

.1140000+01	.1180000+01	.1220000+01
.1890000+00	.1890000+00	.1890000+00

PROBLEM 1 TABLE ORDER PHI OR S VS. DISTRIBUTED LOADS (F THETA, F PHI, F ZETA, M THETA, M PHI)
LOAD IDENTIFICATION CLUES 000100

.1370000+03	.1370000+03	.1370000+03

MATRIX X AND Y (TRANSPOSED) MAGIC OUTPUT

.2332075+00	.0000000	.0000000	.0000000	.1147000+01	.0000000	.0000000	.0000000
.0000000	.1385428+04	-.3786035+04	-.1456701+04	.0000000	.9575738+00	.2029611+00	.1593655+01
.0000000	-.3014519+04	.8237940+04	.3169599+04	.0000000	.1652697+00	.3812993+00	-.3467594+01
.0000000	-.1092249+04	.2984847+04	.7121374+03	.0000000	.6163350-01	.5626974+00	.3746289+00
.7600898+00	.0000000	.0000000	.0000000	.2893392-04	.0000000	.0000000	.0000000
.0000000	.9110431+00	-.1843670+00	-.6937007-01	.0000000	.9209420-05	.1282319-04	.7513669-04
.0000000	.2635995+00	.3391243+00	.5366827+00	.0000000	-.1067891-04	-.2230598-03	-.9364163-03
.0000000	.1143529+01	-.3124983+01	.3740805+00	.0000000	-.6531155-04	-.9806360-03	-.2579548-02
.0000000	-.6947074+01	-.7760565+02	-.2863133+02	.0000000	.1994335-03	.5356730-02	.3073953-01

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.4387414+06	.0000000	.0000000	.0000000	-.3824920+06	.0000000	.0000000	.0000000
FORCZ1	.0000000	.1096712+07	-.3249899+06	-.2607772+05	.0000000	-.1096712+07	.4893588+06	.1095558+04
FORCR1	.0000000	-.3249899+06	.2539679+06	-.2982217+05	.0000000	.3249899+06	-.2399439+06	-.3338988+05
MOME 1	.0000000	-.2607772+05	-.2982217+05	.1506982+05	.0000000	.2607772+05	.2083175+05	.6992362+04
FORCT2	-.3824920+06	.0000000	.0000000	.0000000	.3334568+06	.0000000	.0000000	.0000000
FORCZ2	.0000000	-.1096712+07	.3249899+06	.2607772+05	.0000000	.1096712+07	-.4893588+06	-.1095558+04
FORCR2	.0000000	.4893588+06	-.2399439+06	.2083175+05	.0000000	-.4893588+06	.3869282+06	.4282924+05
MOME 2	.0000000	.1095559+04	-.3338988+05	.6992362+04	.0000000	-.1095559+04	.4282925+05	.1658927+05

SEGMENT SYMMETRY CHECK

.4387414+06	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1096712+07	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.2539679+06	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1506982+05	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.3334568+06	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1096712+07	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.3869282+06	.0000000
.1000000+01	.1000001+01	.1000000+01	.1000000+01	.1000000+01	.1000001+01	.1000000+01	.1658927+05

SEGMENT LOAD MATRICES

.0000000
.1702569+03
.4949093+03
-.5868715+02
.0000000
.2510771+03
.5056950+03

.6378127+02

RZERO(I) = 1.761367+00 RZERO(J) = 2.020236+00

SEGMENT NUMBER 2   SEGMENT CODE 11   ELLIPSE SEGMENT

DTAU	DIFF	STEP	DELTA
.8000000-02	.1000000-03	.1600000-02	.0000000

GEOMETRY INPUT VARIABLES

.3000000+01	.3000000+01	.0000000

ISOT   EPRE   SING   THIC   NOTH   T FREE =   .000   NUMBER OF TABLE COLUMNS = 5

MATERIAL PROPERTY TABLE USED

.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.32500+06	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.40000+00	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000

TABLE ORDER PHI OR S VS. CROSSECTION PROPERTIES

.1220000+01	.1240000+01	.1260000+01	.1280000+01	.1300000+01
.1890000+00	.1890000+00	.1890000+00	.1890000+00	.1890000+00

PROBLEM 1   TABLE ORDER PHI OR S VS. DISTRIBUTED LOADS (F THETA, F PHI, F ZETA, M THETA, M PHI)
LOAD IDENTIFICATION CLUES 000100

.1370000+03	.1370000+03	.1370000+03	.1370000+03	.1370000+03

MATRIX X AND Y (TRANSPOSED) MAGIC OUTPUT

.1438458+00	.0000000	.0000000	.0000000	.1141136+01	.0000000	.0000000	.0000000
.0000000	.6926179+03	-.2494881+04	-.1636566+04	.0000000	.9757747+00	.5573050+00	.2581352+01
.0000000	-.1892755+04	.6817896+04	.4472387+04	.0000000	.1373763+00	-.7445631+00	-.7054200+01
.0000000	-.1166731+04	.4202684+04	.1453206+04	.0000000	.8925179-01	.5925374+00	-.6910923+00
.7679907+00	.0000000	.0000000	.0000000	.3977619-04	.0000000	.0000000	.0000000
.0000000	.8988397+00	-.1610472+00	-.1014686+00	.0000000	.1371231-04	.3810642-04	.1579118-03
.0000000	.4849741+00	-.6210785+00	.5513879+00	.0000000	-.3187621-04	-.5596590-03	-.1631711-02
.0000000	.1761212+01	-.6344067+01	-.6406953+00	.0000000	-.1368867-03	-.1705141-02	-.2641161-02
.0000000	-.1538780+02	-.8150255+02	-.5006590+02	.0000000	.8333823-03	.1878217-04	.7725383-01

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.3641634+06	.0000000	.0000000	.0000000	-.3191235+06	.0000000	.0000000	.0000000
FORCZ1	.0000000	.9482625+06	-.2072667+06	-.2356803+05	.0000000	-.9482625+06	.3661225+06	.1156128+05
FORCR1	.0000000	-.2072667+06	.1503048+06	-.2182397+05	.0000000	.2072667+06	-.1079097+06	-.1948663+05
MOME 1	.0000000	-.2356803+05	-.2182397+05	.1346905+05	.0000000	.2356803+05	.7651203+04	.5094644+04
FORCT2	-.3191235+06	.0000000	.0000000	.0000000	.2796560+06	.0000000	.0000000	.0000000
FORCZ2	.0000000	-.9482625+06	.2072667+06	.2356803+05	.0000000	.9482625+06	-.3661225+06	-.1156128+05
FORCR2	.0000000	.3661225+06	-.1079097+06	.7651202+04	.0000000	-.3661225+06	.2497715+06	.3429483+05
MOME 2	.0000000	.1156128+05	-.1948663+05	.5094644+04	.0000000	-.1156128+05	.3429483+05	.1477098+05

SEGMENT SYMMETRY CHECK

.3641634+06	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.9482625+06	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1503048+06	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1346905+05	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.2796560+06	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.9482625+06	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.2497715+06	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1477098+05

SEGMENT LOAD MATRICES

.0000000
.1254736+03
.7843426+03
-.1194809+03
.0000000
.4050625+03
.7595806+03

.1296867+03

RZERO(I) = 2.020236+00 RZERO(J) = 2.365215+00

INPUT DATA FOR SEGMENT COUPLING

REGION NUMBER 8 NUMBER OF SEGMENT JOINTS 3 NUMBER OF KINEMATIC LINKS 0

SEGMENT	JOINT(I)	JOINT(J)
1	1	2
2	2	3

REGION STIFFNESS MATRIX

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.2290282+06	.0000000	.0000000	.0000000	-.1749694+06	.0000000	.0000000	.0000000
FORCZ1	.0000000	.4539878+06	-.1147960+06	-.2003896+05	.0000000	-.4539878+06	.1964671+06	.1562452+05
FORCR1	.0000000	-.1147960+06	.1268638+06	-.1618027+05	.0000000	.1147960+06	-.4159830+05	-.3695137+04
MOME 1	.0000000	-.2003896+05	-.1618027+05	.1053768+05	.0000000	.2003896+05	-.8688809+04	.1728391+03
FORCT2	-.1749694+06	.0000000	.0000000	.0000000	.1336742+06	.0000000	.0000000	.0000000
FORCZ2	.0000000	-.4539878+06	.1147960+06	.2003896+05	.0000000	.4539878+06	-.1964671+06	-.1562452+05
FORCR2	.0000000	.1964671+06	-.4159830+05	-.8688809+04	.0000000	-.1964671+06	.1788653+06	.3080833+05
MOME 2	.0000000	.1562452+05	-.3695137+04	.1728391+03	.0000000	-.1562452+05	.3080833+05	.1271381+05

REGION SYMMETRY CHECK

.2290282+06	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.4539878+06	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1268638+06	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1053768+05	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1336742+06	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.4539878+06	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1788653+06	.0000000

.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1271381+05

REGION LOAD MATRIX

```
 .0000000
-.2396185+03
 .9551173+03
-.1810534+03
 .0000000
 .1191488+04
 .6557142+03
 .2233914+03
```

REGION NUMBER 9

THERE ARE 2 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 ELLIPSE SEGMENT

DTAU	DIFF	STEP	DELTA
.8000000-02	.1000000-03	.1600000-02	.0000000

GEOMETRY INPUT VARIABLES

.3000000+01	.3000000+01	.0000000

ISOT	EPRE	SING	THIC	NOTH	T FREE =	.000	NUMBER OF TABLE COLUMNS = 5

MATERIAL PROPERTY TABLE USED

.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.32500+06	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.40000+00	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000

TABLE ORDER PHI OR S VS. CROSSECTION PROPERTIES

.1300000+01	.1320000+01	.1340000+01	.1360000+01	.1380000+01
.1890000+00	.1890000+00	.1890000+00	.1890000+00	.1890000+00

PROBLEM 1 TABLE ORDER PHI OR S VS. DISTRIBUTED LOADS (F THETA, F PHI, F ZETA, M THETA, M BHI)
LOAD IDENTIFICATION CLUES 000100

.1370000+03	.1370000+03	.1370000+03	.1370000+03	.1370000+03

MATRIX X AND Y (TRANSPOSED) MAGIC OUTPUT

.7660821-01	.0000000	.0000000	.0000000	.1126080+01	.0000000	.0000000	.0000000
.0000000	.2606622+02	-.1349562+03	-.1447051+04	.0000000	.1019778+01	.1221644+01	.3680084+01
.0000000	-.9369320+02	.4861261+03	.5212424+04	.0000000	-.2849151-02	-.3691545+01	-.1325604+02
.0000000	-.9477400+03	.4906864+04	.2742548+04	.0000000	.1076365+00	.4231372-01	-.3498113+01
.7886519+00	.0000000	.0000000	.0000000	.5455280-04	.0000000	.0000000	.0000000
.0000000	.8761324+00	-.2381505-01	-.1243386+00	.0000000	.2228077-04	.1076411-03	.3094634-03
.0000000	.8557916+00	-.3178121+01	.5877794-01	.0000000	-.9138635-04	-.1297162-02	-.2348777-02
.0000080	.2317384+01	-.1199811+02	-.3327745+01	.0000000	-.2697518-03	-.2438991-02	-.2556553-03
.0000000	-.3494568+02	-.1719788+02	-.7289745+02	.0000000	.3351029-02	.6261237-01	.1796875+00

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.2989809+06	.0000000	.0000000	.0000000	-.2655060+06	.0000000	.0000000	.0000000
FORCZ1	.0000000	.7994818+06	-.1099680+06	-.2321573+05	.0000000	-.7994818+06	.2500859+06	.1783998+05
FORCR1	.0000000	-.1099680+06	.1025637+06	-.1973817+05	.0000000	.1099680+06	-.3511373+05	-.9004940+04
MOME 1	.0000000	-.2321572+05	-.1973817+05	.1291497+05	.0000000	.2321572+05	-.7043656+03	.2941599+04
FORCT2	-.2655060+06	.0000000	.0000000	.0000000	.2357801+06	.0000000	.0000000	.0000000
FORCZ2	.0000000	-.7994818+06	.1099680+06	.2321573+05	.0000000	.7994818+06	-.2500859+06	-.1783998+05
FORCR2	.0000000	.2500859+06	-.3511373+05	-.7043671+03	.0000000	-.2500859+06	.1659584+06	.3022551+05
MOME 2	.0000000	.1783998+05	-.9004939+04	.2941598+04	.0000000	-.1783998+05	.3022551+05	.1402493+05

SEGMENT SYMMETRY CHECK

.2989809+06	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.7994818+06	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1025637+06	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1291497+05	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.2357801+06	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.7994818+06	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000002+01	.1000000+01	.1000000+01	.1659584+06	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1402493+05

SEGMENT LOAD MATRICES

.0000000
-.1136338+03
.1149296+04
-.2193775+03
.0000000
.7264276+03
.1040864+04

```
.2372265+03
RZERO(I) =    2.305215+00      -   RZERO(J) =    2.595727+00
```

SEGMENT NUMBER 2 SEGMENT CODE 11 ELLIPSE SEGMENT

DTAU	DIFF	STEP	DELTA
.6500000-02	.1000000-03	.1300000-02	.0000000

GEOMETRY INPUT VARIABLES

.3000000+01	.3000000+01	.0000000

ISOT EPRE SING THIC NOTH T FREE = .000 NUMBER OF TABLE COLUMNS = 5

MATERIAL PROPERTY TABLE USED

.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.32500+06	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.40000+00	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000

TABLE ORDER PHI OR S VS. CROSSECTION PROPERTIES

.1380000+01	.1395000+01	.1410000+01	.1430000+01	.1445000+01
.1890000+00	.1890000+00	.1890000+00	.1890000+00	.1890000+00

PROBLEM 1 TABLE ORDER PHI OR S VS. DISTRIBUTED LOADS (F THETA, F PHI, F ZETA, M THETA, M PHI)
LOAD IDENTIFICATION CLUES 000100

.1370000+03	.1370000+03	.1370000+03	.1370000+03	.1370000+03

MATRIX X AND Y (TRANSPOSED) MAGIC OUTPUT

.2875496-01	.0000000	.0000000	.0000000	.1080620+01	.0000000	.0000000	.0000000
.0000000	.9952157+01	-.7869549+02	-.9356314+03	.0000000	.1010334+01	.8401688+00	.2469854+01
.0000000	-.5152667+02	.4074409+03	.4844173+04	.0000000	.5178679-03	-.3688329+01	-.1278751+02
.0000000	-.5880489+03	.4649926+04	.2689607+04	.0000000	.1075534+00	.4347806-01	-.3556943+01
.8563811+00	.0000000	.0000000	.0000000	.5816158-04	.0000000	.0000000	.0000000
.0000000	.9182108+00	-.1855278-01	-.1188021+00	.0000000	.2322522-04	.1115812-03	.3085243-03
.0000000	.5986517+00	-.3334988+01	.5699953-01	.0000000	-.1001435-03	-.1504284-02	-.2624195-02
.0000000	.1512312+01	-.1195843+02	-.3439408+01	.0000000	-.2813654-03	-.2688461-02	-.2491289-03
.0000000	-.2599654+02	-.1433942+02	-.8036603+02	.0000000	.3815304-02	.7532039-01	.2076661+00

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.3030230+06	.0000000	.0000000	.0000000	-.2804160+06	.0000000	.0000000	.0000000
FORCZ1	.0000000	.8704526+06	-.6214866+05	-.2302134+05	.0000000	-.8704526+06	.2057013+06	.1926101+05
FORCR1	.0000000	-.6214866+05	.8724578+05	-.2162012+05	.0000000	.6214866+05	-.1530529+05	-.7910438+04
MOME 1	.0000000	-.2302134+05	-.2162012+05	.1381626+05	.0000000	.2302134+05	.1102811+04	.3149203+04
FORCT2	-.2804160+06	.0000000	.0000000	.0000000	.2594960+06	.0000000	.0000000	.0000000
FORCZ2	.0000000	-.8704526+06	.6214866+05	.2302134+05	.0000000	.8704526+06	-.2057013+06	-.1926101+05
FORCR2	.0000000	.2057013+06	-.1530529+05	.1102810+04	.0000000	-.2057013+06	.1316309+06	.2892217+05
MOME 2	.0000000	.1926161+05	-.7910437+04	.3149202+04	.0000000	-.1926161+05	.2892218+05	.1457807+05

SEGMENT SYMMETRY CHECK

.3030230+06	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.8704526+06	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.8724578+05	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1381626+05	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.2594960+06	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.8704526+06	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000001+01	.1000000+01	.1000000+01	.1316309+06	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1457807+05

SEGMENT LOAD MATRICES

.0000000
-.2478773+03
.1328916+04
-.2674103+03
.0000000
.7341218+03
.1237718+04

.2814330+03

RZERO(I) = 2.595727+00 RZERO(J) = 2.804916+00

INPUT DATA FOR SEGMENT COUPLING

REGION NUMBER 9 NUMBER OF SEGMENT JOINTS 3 NUMBER OF KINEMATIC LINKS 0

SEGMENT	JOINT(I)	JOINT(J)
1	1	2
2	2	3

REGION STIFFNESS MATRIX

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.1681475+06	.0000000	.0000000	.0000000	-.1381805+06	.0000000	.0000000	.0000000
FORCZ1	.0000000	.3645961+06	-.5032270+05	-.1368998+05	.0000000	-.3645961+06	.8702083+05	.1174775+05
FORCR1	.0000000	-.5032270+05	.9278326+05	-.2018321+05	.0000000	.5032270+05	-.1041563+05	-.7431694+03
MOME 1	.0000000	-.1368998+05	-.2018321+05	.1207005+05	.0000000	.1368998+05	-.4075313+04	-.6611726+03
FORCT2	-.1381805+06	.0000000	.0000000	.0000000	.1135556+06	.0000000	.0000000	.0000000
FORCZ2	.0000000	-.3645961+06	.5032270+05	.1368998+05	.0000000	.3645961+06	-.8702083+05	-.1174775+05
FORCR2	.0000000	.8702083+05	-.1041563+05	-.4075313+04	.0000000	-.8702083+05	.1021897+06	.2624465+05
MOME 2	.0000000	.1174775+05	-.7431694+03	-.6611726+03	.0000000	-.1174775+05	.2624465+05	.1376639+05

REGION SYMMETRY CHECK

.1681475+06	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.3645961+06	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.9278326+05	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1207005+05	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1135556+06	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.3645961+06	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1021897+06	.0000000

```
.1000000+01    .1000000+01    .1000000+01    .1000000+01    .1000000+01    .1000000+01    .1000000+01    .1376639+05

                                    REGION LOAD MATRIX

 .0000000
-.1156976+04
 .1294347+04
-.2679430+03
 .0000000
 .2256015+04
 .8933591+03
 .3344680+03
```

REGION NUMBER 10

THERE ARE 2 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 ELLIPSE SEGMENT

DTAU	DIFF	STEP	DELTA
.6000000-02	.1000000-03	.1200000-02	.0000000

GEOMETRY INPUT VARIABLES

.3000000+01 .3000000+01 .0000000

ISOT EPRE SING THIC NOTH T FREE = .000 NUMBER OF TABLE COLUMNS = 5

MATERIAL PROPERTY TABLE USED

.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.32560+06	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.40000+00	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000

TABLE ORDER PHI OR S VS. CROSSECTION PROPERTIES

.1445000+01	.1460000+01	.1475000+01	.1490000+01	.1505000+01
.1890000+00	.1890000+00	.1890000+00	.1890000+00	.1890000+00

PROBLEM 1 TABLE ORDER PHI OR S VS. DISTRIBUTED LOADS (F THETA, F PHI, F ZETA, M THETA, M PHI)
LOAD IDENTIFICATION CLUES 000100

.1370000+03	.1370000+03	.1370000+03	.1370000+03	.1370000+03

MATRIX X AND Y (TRANSPOSED) MAGIC OUTPUT

.9724919-02	.0000000	.0000000	.0000000	.1049264+01	.0000000	.0000000	.0000000
.0000000	-.1695549+02	.2573246+03	-.5761242+03	.0000000	.1012835+01	.6678027+00	.1794241+01
.0000000	.1340735+03	-.2034763+04	.4555634+04	.0000000	-.5575415-01	-.4756528+01	-.1418774+02
.0000000	-.2923861+03	.4437390+04	.3021424+04	.0000000	.1065474+00	-.2866377+00	-.4649056+01
.9083178+00	.0000000	.0000000	.0000000	.6421503-04	.0000000	.0000000	.0000000
.0000000	.9446968+00	.4380891-01	-.1142016+00	.0000000	.2678198-04	.1408559-03	.3508392-03
.0000000	.4141943+00	-.4467332+01	-.2642472+00	.0000000	-.1316414-03	-.1885824-02	-.2788680-02
.0000000	.8961783+00	-.1360083+02	-.4554211+01	.0000000	-.3307859-03	-.2828964-02	.1247499-02
.0000000	-.2658713+02	.3136569+02	-.8491549+02	.0000000	.5493016-02	.1047168+00	.2600698+00

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.2879703+06	.0000000	.0000000	.0000000	-.2744499+06	.0000000	.0000000	.0000000
FORCZ1	.0000000	.8594438+06	-.1064369+05	-.2273069+05	.0000000	-.8594438+06	.1491329+06	.2068052+05
FORCR1	.0000000	-.1064369+05	.7954824+05	-.2282146+05	.0000000	.1064369+05	.3058229+03	-.5089819+04
MOME 1	.0000000	-.2273069+05	-.2282146+05	.1422802+05	.0000000	.2273069+05	.9059247+03	.2689838+04
FORCT2	-.2744499+06	.0000000	.0000000	.0000000	.2615645+06	.0000000	.0000000	.0000000
FORCZ2	.0000000	-.8594438+06	.1064369+05	.2273069+05	.0000000	.8594438+06	-.1491329+06	-.2068052+05
FORCR2	.0000000	.1491329+06	.3058247+03	.9059237+03	.0000000	-.1491329+06	.1052887+06	.2732505+05
MOME 2	.0000000	.2068052+05	-.5089818+04	.2689838+04	.0000000	-.2068052+05	.2732505+05	.1470772+05

SEGMENT SYMMETRY CHECK

.2879703+06	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.8594437+06	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.7954824+05	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1422802+05	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.2615645+06	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.8594437+06	.0000000	.0000000
.1000000+01	.1000000+01	.1000006+01	.1000001+01	.1000000+01	.1000000+01	.1052887+06	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1470772+05

SEGMENT LOAD MATRICES

.0000000
-.4773057+03
.1487175+04
-.3241216+03
.0000000
.8190390+03
.1409217+04

.3347950+03

RZERO(I) =   2.804916+00   RZERO(J) =   2.943051+00

SEGMENT NUMBER 2 SEGMENT CODE 11 ELLIPSE SEGMENT

DTAU	DIFF	STEP	DELTA
.6579400-02	.1000000-03	.1315860-02	.0000000

GEOMETRY INPUT VARIABLES

.3000000+01	.3000000+01	.0000000

ISOT EPRE SING THIC NOTH T FREE = .000 NUMBER OF TABLE COLUMNS = 5

MATERIAL PROPERTY TABLE USED

.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.32500+06	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.40000+00	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000

TABLE ORDER PHI OR S VS. CROSSECTION PROPERTIES

.1505000+01	.1520000+01	.1540000+01	.1555000+01	.1570793+01
.1890000+00	.1890000+00	.1890000+00	.1890000+00	.1890000+00

PROBLEM 1 TABLE ORDER PHI OR S VS. DISTRIBUTED LOADS (F THETA, F PHI, F ZETA, M THETA, M PHI)

LOAD IDENTIFICATION CLUES 000100

.1370000+03	.1370000+03	.1370000+03	.1370000+03	.1370000+03

MATRIX A AND Y (TRANSPOSED) MAGIC OUTPUT

.1618421-02	.0000000	.0000000	.0000000	.1019356+01	.0000000	.0000000	.0000000
.0000000	-.3222662-02	.9673322+03	-.1569086+03	.0000000	.1026444+01	.6069258+00	.1226438+01
.0000000	.4890865-01	-.1468069+05	.2381320+04	.0000000	-.3684176+00	-.9210945+01	-.1861302+02
.0000000	-.7632926-02	.2351016+04	.4012850+04	.0000000	.5763311-01	-.2132689+01	-.9123855+01
.9623886+00	.0000000	.0000000	.0000000	.7807367-04	.0000000	.0000000	.0000000
.0000000	.9768930+00	.3629700+00	-.6117758-01	.0000000	.4003561-04	.2541399-03	.4668371-03
.0000000	.6453070-01	-.8966737+01	-.2094892+01	.0000000	-.2472449-03	-.2659020-02	-.1571834-02
.0000000	.6096715-04	-.1829992+02	-.9052384+01	.0000000	-.4549803-03	-.1576122-02	.9688402-02
.0000000	-.7728919+01	.2847865+03	-.4832215+02	.0000000	.1294339-01	.2003821+00	.3672126+00

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.2414343+06	.0000000	.0000000	.0000000	-.2368498+06	.0000000	.0000000	.0000000
FORCZ1	.0000000	.7261593+06	.3413332+05	-.2153454+05	.0000000	-.7261593+06	.8040680+05	.2102114+05
FORCR1	.0000000	.3413332+05	.7901071+05	-.2383859+05	.0000000	-.3413332+05	.1009045+05	-.3856152+02
MOME 1	.0000000	-.2153453+05	-.2383859+05	.1428521+05	.0000000	.2153453+05	-.1342843+04	.1115799+04
FORCT2	-.2368498+06	.0000000	.0000000	.0000000	.2323524+06	.0000000	.0000000	.0000000
FORCZ2	.0000000	-.7261593+06	-.3413332+05	.2153454+05	.0000000	.7261593+06	-.8040680+05	-.2102114+05
FORCR2	.0000000	.8040680+05	.1009045+05	-.1342844+04	.0000000	-.8040680+09	.8617471+05	.2536101+05
MOME 2	.0000000	.2102114+05	-.3856028+02	.1115799+04	.0000000	-.2102114+05	.2536101+05	.1447357+05

SEGMENT SYMMETRY CHECK

.2414343+06	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.7261593+06	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.7901071+05	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1428521+05	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.2323524+06	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.7261593+06	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000001+01	.1000000+01	.1000000+01	.8617471+05	.0000000
.1000000+01	.1000000+01	.1000032+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1447357+05

SEGMENT LOAD MATRICES

.0000000
-.1006596+04
.1594282+04
-.4000729+03
.0000000
.1152265+04
.1546095+04

.4057657+03

RZERO(I) = 2.943051+00 RZERO(J) = 3.000000+00

INPUT DATA FOR SEGMENT COUPLING

REGION NUMBER 10   NUMBER OF SEGMENT JOINTS 3   NUMBER OF KINEMATIC LINKS 0

SEGMENT	JOINT(I)	JOINT(J)
1	1	2
2	2	3

REGION STIFFNESS MATRIX

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.1382229+06	.0000000	.0000000	.0000000	-.1292317+06	.0000000	.0000000	.0000000
FORCZ1	.0000000	.3505733+06	-.5822182+04	-.1138561+05	.0000000	-.3505733+06	.3579423+05	.1080565+05
FORCR1	.0000000	-.5822182+04	.7864032+05	-.2242215+05	.0000000	.5822182+04	-.5062150+03	.1382970+03
MOME 1	.0000000	-.1138561+05	-.2242215+05	.1347694+05	.0000000	.1138561+05	-.1473469+04	-.5202339+03
FORCT2	-.1292317+06	.0000000	.0000000	.0000000	.1208256+06	.0000000	.0000000	.0000000
FORCZ2	.0000000	-.3505733+06	.5822182+04	.1138561+05	.0000000	.3505733+06	-.3579424+05	-.1080565+05
FORCR2	.0000000	.3579423+05	-.5062150+03	-.1473469+04	.0000000	-.3579424+05	.8063578+05	.2411498+05
MOME 2	.0000000	.1080565+05	.1382970+03	-.5202339+03	.0000000	-.1080565+05	.2411498+05	.1408203+05

REGION SYMMETRY CHECK

.1382229+06	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.3505733+06	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.7864032+05	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1347694+05	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1208256+06	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.3505733+06	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.8063578+05	.0000000

.1000000+01 .1000000+01 .1000000+01 .1000000+01 .1000000+01 .1000000+01 .1000000+01 .1408203+05

REGION LOAD MATRIX

.0000000
-.2060574+04
.1456748+04
-.3556945+03
.0000000
.2547976+04
.1287168+04
.3876500+03

INPUT DATA FOR REGION COUPLING

NUMBER OF REGION JOINTS 11 NUMBER OF KINEMATIC LINKS 0

REGION	JOINT(I)	JOINT(J)
1	1	2
2	2	3
3	3	4
4	4	5
5	5	6
6	6	7
7	7	8
8	8	9
9	9	10
10	10	11

BOUNDARY CONDITIONS

JOINT	DELTA T	DELTA Z	DELTA R	THETA	ANGLE ALPHA
1	0	1	0	0	.0000000
2	0	1	1	1	.0000000
3	0	1	1	1	.0000000
4	0	1	1	1	.0000000
5	0	1	1	1	.0000000
6	0	1	1	1	.0000000
7	0	1	1	1	.0000000
8	0	1	1	1	.0000000
9	0	1	1	1	.0000000
10	0	1	1	1	.0000000
11	0	0	1	0	.0000000

THE EXPANDED REGION JOINT DISPLACEMENT MATRIX (REGION END DEFLECTIONS)

JOINT	PROBLEM	DELTA T	DELTA Z	DELTA R	OMEGA-THETA
1	1	.0000000	-.1259735-02	.0000000	.0000000
2	1	.0000000	-.1275537-02	-.8291140-04	.4321750-03
3	1	.0000000	-.1335809-02	-.1823169-03	.8410902-03
4	1	.0000000	-.1477223-02	-.3548055-03	.1330041-02
5	1	.0000000	-.1771644-02	-.7153756-03	.1886134-02
6	1	.0000000	-.2250264-02	-.1439058-02	.2332128-02
7	1	.0000000	-.2908395-02	-.2892370-02	.2510252-02
8	1	.0000000	-.3456444-02	-.5075870-02	.2386273-02
9	1	.0000000	-.3592480-02	-.8765408-02	.1941274-02
10	1	.0000000	-.2435258-02	-.1304375-01	.1090339-02
11	1	.0000000	.0000000	-.1494369-01	.0000000

REGION NUMBER 1

THERE ARE 2 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 ELLIPSE SEGMENT

PHI OR S	NTHETA	NPHI	OMEGATH
3.4091000-02	-4.0778069+01	-1.0194518+02	0.0000000
3.8181900-02	-4.6982562+01	-9.5725761+01	3.0648921-05
4.2272800-02	-5.1480570+01	-9.1221946+01	5.8280213-05
4.6363700-02	-5.4848217+01	-8.7856613+01	8.3673256-05
5.0454600-02	-5.7437943+01	-8.5276574+01	1.0735630-04
5.4545500-02	-5.9475167+01	-8.3255842+01	1.2970039-04
5.8636400-02	-6.1109491+01	-8.1644361+01	1.5097399-04
6.2727300-02	-6.2443364+01	-8.0339323+01	1.7137635-04
6.6818200-02	-6.3548846+01	-7.9268376+01	1.9105852-04
7.0909100-02	-6.4477816+01	-7.8379400+01	2.1013725-04
7.5000000-02	-6.5268387+01	-7.7634078+01	2.2870424-04

SEGMENT NUMBER 2 SEGMENT CODE 11 ELLIPSE SEGMENT

PHI OR S	NTHETA	NPHI	OMEGATH
7.5000000-02	-6.5268328+01	-7.7633936+01	2.2870378-04
8.0000000-02	-6.6087637+01	-7.6876817+01	2.5080770-04
8.5000000-02	-6.6780976+01	-7.6252998+01	2.7236093-04
9.0000000-02	-6.7376542+01	-7.5734086+01	2.9344622-04
9.5000000-02	-6.7895284+01	-7.5298944+01	3.1412937-04
1.0000000-01	-6.8353045+01	-7.4931578+01	3.3446343-04
1.0500000-01	-6.8761978+01	-7.4619703+01	3.5449163-04
1.1000000-01	-6.9131541+01	-7.4353757+01	3.7424965-04
1.1500000-01	-6.9469172+01	-7.4126204+01	3.9376719-04
1.2000000-01	-6.9780790+01	-7.3931044+01	4.1306921-04
1.2400000-01	-7.0014587+01	-7.3794962+01	4.2836998-04
1.2500000-01	-7.0071157+01	-7.3763448+01	4.3217686-04

REGION NUMBER 2

THERE ARE 2 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 ELLIPSE SEGMENT

PHI OR S	NTHETA	NPHI	OMEGATH
1.2900000-01	-7.0071163+01	-7.3763472+01	4.3217496-04
1.3050000-01	-7.0370603+01	-7.3606297+01	4.5298913-04
1.3600000-01	-7.0653148+01	-7.3473514+01	4.7361047-04
1.4150000-01	-7.0922170+01	-7.3361690+01	4.9405642-04
1.4700000-01	-7.1180424+01	-7.3268025+01	5.1434198-04
1.5250000-01	-7.1430173+01	-7.3190213+01	5.3448010-04
1.5800000-01	-7.1673299+01	-7.3126341+01	5.5448202-04
1.6350000-01	-7.1911369+01	-7.3074810+01	5.7435757-04
1.6900000-01	-7.2145705+01	-7.3034281+01	5.9411536-04
1.7450000-01	-7.2377425+01	-7.3003620+01	6.1376298-04
1.7890000-01	-7.2561560+01	-7.2985545+01	6.2940628-04
1.8000000-01	-7.2607478+01	-7.2981865+01	6.3330714-04

SEGMENT NUMBER 2 SEGMENT CODE 11 ELLIPSE SEGMENT

PHI OR S	NTHETA	NPHI	OMEGATH
1.8000000-01	-7.2607450+01	-7.2981822+01	6.3330407-04
1.8600000-01	-7.2857468+01	-7.2967282+01	6.5451406-04
1.9200000-01	-7.3107372+01	-7.2961456+01	6.7561478-04
1.9800000-01	-7.3357938+01	-7.2963573+01	6.9661232-04
2.0400000-01	-7.3609829+01	-7.2972973+01	7.1751203-04
2.1000000-01	-7.3863621+01	-7.2989091+01	7.3831867-04
2.1600000-01	-7.4119813+01	-7.3011441+01	7.5903650-04
2.2200000-01	-7.4378841+01	-7.3039602+01	7.7966929-04
2.2800000-01	-7.4641095+01	-7.3073212+01	8.0022043-04
2.3400000-01	-7.4906911+01	-7.3111953+01	8.2069291-04
2.4000000-01	-7.5176596+01	-7.3155551+01	8.4108944-04

REGION NUMBER 3

THERE ARE 2 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 ELLIPSE SEGMENT

PHI OR S	NTHETA	NPHI	OMEGATH
2.4000000-01	-7.5176543+01	-7.3155416+01	8.4109023-04
2.4700000-01	-7.5496421+01	-7.3212096+01	8.6479450-04
2.5400000-01	-7.5822316+01	-7.3274732+01	8.8840179-04
2.6100000-01	-7.6154572+01	-7.3343038+01	9.1191501-04
2.6800000-01	-7.6493499+01	-7.3416772+01	9.3533673-04
2.7500000-01	-7.6839373+01	-7.3495726+01	9.5866914-04
2.8200000-01	-7.7192449+01	-7.3579720+01	9.8191411-04
2.8900000-01	-7.7552961+01	-7.3668603+01	1.0050732-03
2.9600000-01	-7.7921125+01	-7.3762242+01	1.0281478-03
3.0300000-01	-7.8297141+01	-7.3860524+01	1.0511390-03
3.0860000-01	-7.8603735+01	-7.3942429+01	1.0694724-03
3.1000800-01	-7.8681198+01	-7.3963355+01	1.0740475-03

SEGMENT NUMBER 2 SEGMENT CODE 11 ELLIPSE SEGMENT

PHI OR S	NTHETA	NPHI	OMEGATH
3.1000000-01	-7.8681204+01	-7.3963353+01	1.0740407-03
3.1800000-01	-7.9130201+01	-7.4086340+01	1.1001276-03
3.2600000-01	-7.9590186+01	-7.4215063+01	1.1261021-03
3.3400000-01	-8.0061400+01	-7.4349442+01	1.1519703-03
3.4200000-01	-8.0544072+01	-7.4489413+01	1.1777324-03
3.5000000-01	-8.1038425+01	-7.4634931+01	1.2033879-03
3.5800000-01	-8.1544676+01	-7.4785957+01	1.2289365-03
3.6600000-01	-8.2063035+01	-7.4942472+01	1.2543772-03
3.7400000-01	-8.2593710+01	-7.5104462+01	1.2797090-03
3.8200000-01	-8.3136905+01	-7.5271924+01	1.3049305-03
3.9000000-01	-8.3692822+01	-7.5444866+01	1.3300404-03

REGION NUMBER 4

THERE ARE 2 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 ELLIPSE SEGMENT

PHI OR S	NTHETA	NPHI	OMEGATH
3.9600000-01	-8.3692903+01	-7.5445067+01	1.3300409-03
3.9900000-01	-8.4333776+01	-7.5646196+01	1.3581552-03
4.0800000-01	-8.4991296+01	-7.5854310+01	1.3861232-03
4.1700000-01	-8.5665749+01	-7.6069452+01	1.4139418-03
4.2600000-01	-8.6357423+01	-7.6291675+01	1.4416072-03
4.3500000-01	-8.7066609+01	-7.6521040+01	1.4691158-03
4.4400000-01	-8.7793602+01	-7.6757617+01	1.4964632-03
4.5300000-01	-8.8538695+01	-7.7001486+01	1.5236450-03
4.6200000-01	-8.9302191+01	-7.7252732+01	1.5506562-03
4.7100000-01	-9.0084392+01	-7.7511451+01	1.5774916-03
4.7820000-01	-9.0723827+01	-7.7723872+01	1.5988297-03
4.8000000-01	-9.0885607+01	-7.7777740+01	1.6041457-03

SEGMENT NUMBER 2 SEGMENT CODE 11 ELLIPSE SEGMENT

PHI OR S	NTHETA	NPHI	OMEGATH
4.8000000-01	-9.0885592+01	-7.7777711+01	1.6041448-03
4.9000000-01	-9.1798511+01	-7.8082601+01	1.6335407-03
5.0000000-01	-9.2735724+01	-7.8397129+01	1.6626969-03
5.1000000-01	-9.3697682+01	-7.8721463+01	1.6916045-03
5.2000000-01	-9.4684837+01	-7.9065779+01	1.7202539-03
5.3000000-01	-9.5697648+01	-7.9400262+01	1.7486351-03
5.4000000-01	-9.6736588+01	-7.9755107+01	1.7767377-03
5.5000000-01	-9.7802140+01	-8.0120518+01	1.8045506-03
5.6000000-01	-9.8894791+01	-8.0496707+01	1.8320624-03
5.7000000-01	-1.0001504+02	-8.0883896+01	1.8592611-03
5.7800000-01	-1.0093145+02	-8.1201722+01	1.8807862-03
5.8000000-01	-1.0116340+02	-8.1282316+01	1.8861342-03

REGION NUMBER 5

THERE ARE 2 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 ELLIPSE SEGMENT

PHI OR S	NTHETA	NPHI	OMEGATH
5.8000000-01	-1.0116339+02	-8.1282289+01	1.8861345-03
5.9000000-01	-1.0234037+02	-8.1692179+01	1.9126687-03
6.0000000-01	-1.0354652+02	-8.2113788+01	1.9388511-03
6.1000000-01	-1.0478236+02	-8.2547373+01	1.9646676-03
6.2000000-01	-1.0604843+02	-8.2993199+01	1.9961040-03
6.3000000-01	-1.0734531+02	-8.3451543+01	2.0151455-03
6.4000000-01	-1.0867357+02	-8.3922688+01	2.0397767-03
6.5000000-01	-1.1003377+02	-8.4406927+01	2.0639821-03
6.6000000-01	-1.1142650+02	-8.4904564+01	2.0877455-03
6.7000000-01	-1.1285238+02	-8.5415911+01	2.1110505-03
6.8000000-01	-1.1431199+02	-8.5941288+01	2.1338803-03

SEGMENT NUMBER 2 SEGMENT CODE 11 ELLIPSE SEGMENT

PHI OR S	NTHETA	NPHI	OMEGATH
6.8000000-01	-1.1431198+02	-8.5941270+01	2.1338791-03
6.9000000-01	-1.1580595+02	-8.6481008+01	2.1562163-03
7.0000000-01	-1.1733490+02	-8.7035448+01	2.1780436-03
7.1000000-01	-1.1889948+02	-8.7604941+01	2.1993431-03
7.2000000-01	-1.2050032+02	-8.8189646+01	2.2200969-03
7.3000000-01	-1.2213808+02	-8.8790531+01	2.2402866-03
7.4000000-01	-1.2381342+02	-8.9407378+01	2.2598940-03
7.5000000-01	-1.2552700+02	-9.0040775+01	2.2789006-03
7.6000000-01	-1.2727951+02	-9.0691122+01	2.2972876-03
7.7000000-01	-1.2907164+02	-9.1358827+01	2.3150306-03
7.8000000-01	-1.3090408+02	-9.2044311+01	2.3321268-03

REGION NUMBER 6

THERE ARE 2 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 ELLIPSE SEGMENT

PHI OR S	NTHETA	NPHI	OMEGATH
7.8000000-01	-1.3090406+02	-9.2044262+01	2.3321280-03
7.9000000-01	-1.3277751+02	-9.2747972+01	2.3485451-03
8.0000000-01	-1.3469268+02	-9.3470309+01	2.3642666-03
8.1000000-01	-1.3665029+02	-9.4211743+01	2.3792805-03
8.2000000-01	-1.3865166+02	-9.4972732+01	2.3935627-03
8.3000000-01	-1.4069573+02	-9.5753745+01	2.4070978-03
8.4000000-01	-1.4278504+02	-9.6555262+01	2.4198686-03
8.5000000-01	-1.4491973+02	-9.7377769+01	2.4318565-03
8.6000000-01	-1.4710056+02	-9.8221767+01	2.4430513-03
8.7000000-01	-1.4932828+02	-9.9087761+01	2.4534315-03
8.8000000-01	-1.5160367+02	-9.9976268+01	2.4629842-03

SEGMENT NUMBER 2 SEGMENT CODE 11 ELLIPSE SEGMENT

PHI OR S	NTHETA	NPHI	OMEGATH
8.8000000-01	-1.5160366+02	-9.9976255+01	2.4629844-03
8.9000000-01	-1.5392749+02	-1.0088780+02	2.4716955-03
9.0000000-01	-1.5630055+02	-1.0182291+02	2.4795514-03
9.1000000-01	-1.5872361+02	-1.0278213+02	2.4865393-03
9.2000000-01	-1.6119748+02	-1.0376601+02	2.4926474-03
9.3000000-01	-1.6372295+02	-1.0477510+02	2.4978646-03
9.4000000-01	-1.6630085+02	-1.0580997+02	2.5021806-03
9.5000000-01	-1.6893198+02	-1.0687116+02	2.5055859-03
9.6000000-01	-1.7161716+02	-1.0795927+02	2.5080717-03
9.7000000-01	-1.7435723+02	-1.0907484+02	2.5096299-03
9.7800000-01	-1.7658936+02	-1.0998747+02	2.5102034-03
9.8000000-01	-1.7715301+02	-1.1021847+02	2.5102529-03

REGION NUMBER 7

THERE ARE 2 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 ELLIPSE SEGMENT

PHI OR S	NTHETA	NPHI	OMEGATH
9.8000000-01	-1.7715300+02	-1.1021847+02	2.5102517-03
9.8800000-01	-1.7943030+02	-1.1115395+02	2.5100720-03
9.9600000-01	-1.8174423+02	-1.1210804+02	2.5092857-03
1.0040000+00	-1.8409521+02	-1.1308104+02	2.5078894-03
1.0120000+00	-1.8648368+02	-1.1407323+02	2.5058798-03
1.0200000+00	-1.8891005+02	-1.1508489+02	2.5032533-03
1.0280000+00	-1.9137477+02	-1.1611633+02	2.5000066-03
1.0360000+00	-1.9387824+02	-1.1716780+02	2.4961357-03
1.0440000+00	-1.9642089+02	-1.1823959+02	2.4916365-03
1.0520000+00	-1.9900312+02	-1.1933197+02	2.4865047-03
1.0600000+00	-2.0162535+02	-1.2044519+02	2.4807352-03

SEGMENT NUMBER 2 SEGMENT CODE 11 ELLIPSE SEGMENT

PHI OR S	NTHETA	NPHI	OMEGATH
1.0600000+00	-2.0162534+02	-1.2044519+02	2.4807341-03
1.0680000+00	-2.0428794+02	-1.2157950+02	2.4743211-03
1.0760000+00	-2.0699129+02	-1.2273515+02	2.4672582-03
1.0840000+00	-2.0973574+02	-1.2391235+02	2.4595303-03
1.0920000+00	-2.1252164+02	-1.2511133+02	2.4511534-03
1.1000000+00	-2.1534928+02	-1.2633228+02	2.4420940-03
1.1080000+00	-2.1821895+02	-1.2757538+02	2.4323500-03
1.1160000+00	-2.2113089+02	-1.2884079+02	2.4219097-03
1.1240000+00	-2.2408530+02	-1.3012863+02	2.4107601-03
1.1320000+00	-2.2708232+02	-1.3143902+02	2.3988869-03
1.1384000+00	-2.2951069+02	-1.3250363+02	2.3888565-03
1.1400000+00	-2.3012206+02	-1.3277204+02	2.3862740-03

REGION NUMBER 8

THERE ARE 2 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 ELLIPSE SEGMENT

PHI OR S	NTHETA	NPHI	OMEGATH
1.1400000+00	-2.3012205+02	-1.3277204+02	2.3862734-03
1.1480000+00	-2.3320453+02	-1.3412772+02	2.3729635-03
1.1560000+00	-2.3632971+02	-1.3550608+02	2.3587573-03
1.1640000+00	-2.3949747+02	-1.3690709+02	2.3438142-03
1.1720000+00	-2.4270758+02	-1.3833066+02	2.3280520-03
1.1800000+00	-2.4595974+02	-1.3977666+02	2.3114468-03
1.1880000+00	-2.4925351+02	-1.4124492+02	2.2939732-03
1.1960000+00	-2.5258831+02	-1.4273519+02	2.2756046-03
1.2040000+00	-2.5596347+02	-1.4424715+02	2.2563127-03
1.2120000+00	-2.5937812+02	-1.4578043+02	2.2360681-03
1.2184000+00	-2.6213760+02	-1.4702209+02	2.2191661-03
1.2200000+00	-2.6283124+02	-1.4733455+02	2.2148464-03

SEGMENT NUMBER 2 SEGMENT CODE 11 ELLIPSE SEGMENT

PHI OR S	NTHETA	NPHI	OMEGATH
1.2200000+00	-2.6283123+02	-1.4733455+02	2.2148391-03
1.2280000+00	-2.6632162+02	-1.4890898+02	2.1925962-03
1.2360000+00	-2.6984788+02	-1.5050308+02	2.1693062-03
1.2440000+00	-2.7340840+02	-1.5211609+02	2.1449359-03
1.2520000+00	-2.7700134+02	-1.5374718+02	2.1194521-03
1.2600000+00	-2.8062461+02	-1.5539538+02	2.0928210-03
1.2680000+00	-2.8427588+02	-1.5705959+02	2.0650086-03
1.2760000+00	-2.8795252+02	-1.5873859+02	2.0359813-03
1.2840000+00	-2.9165162+02	-1.6043102+02	2.0057056-03
1.2920000+00	-2.9536995+02	-1.6213536+02	1.9741464-03
1.2984000+00	-2.9835609+02	-1.6350629+02	1.9479563-03
1.3000000+00	-2.9910396+02	-1.6384994+02	1.9412774-03

REGION NUMBER 9

THERE ARE 2 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 ELLIPSE SEGMENT

PHI OR S	NTHETA	NPHI	OMEGATH
1.3000000+00	-2.9910394+02	-1.6384995+02	1.9412742-03
1.3080000+00	-3.0284974+02	-1.6557294+02	1.9070568-03
1.3160000+00	-3.0660310+02	-1.6730232+02	1.8714630-03
1.3240000+00	-3.1035939+02	-1.6903590+02	1.8344634-03
1.3320000+00	-3.1411364+02	-1.7077132+02	1.7960303-03
1.3400000+00	-3.1786047+02	-1.7250599+02	1.7561376-03
1.3480000+00	-3.2159410+02	-1.7423715+02	1.7147611-03
1.3560000+00	-3.2530837+02	-1.7596184+02	1.6718792-03
1.3640000+00	-3.2899670+02	-1.7767690+02	1.6274724-03
1.3720000+00	-3.3265211+02	-1.7937897+02	1.5815247-03
1.3784000+00	-3.3554779+02	-1.8072888+02	1.5436481-03
1.3800000+00	-3.3626723+02	-1.8106448+02	1.5340229-03

SEGMENT NUMBER 2 SEGMENT CODE 11 ELLIPSE SEGMENT

PHI OR S	NTHETA	NPHI	OMEGATH
1.3800000+00	-3.3626721+02	-1.8106448+02	1.5340209-03
1.3865000+00	-3.3916948+02	-1.8241919+02	1.4942744-03
1.3930000+00	-3.4203570+02	-1.8375839+02	1.4534927-03
1.3995000+00	-3.4486138+02	-1.8507992+02	1.4116748-03
1.4060000+00	-3.4764187+02	-1.8638152+02	1.3688219-03
1.4125000+00	-3.5037242+02	-1.8766088+02	1.3249375-03
1.4190000+00	-3.5304813+02	-1.8891562+02	1.2800275-03
1.4255000+00	-3.5566400+02	-1.9014330+02	1.2341005-03
1.4320000+00	-3.5821497+02	-1.9134147+02	1.1871676-03
1.4385000+00	-3.6069587+02	-1.9250761+02	1.1392429-03
1.4437000+00	-3.6262666+02	-1.9341576+02	1.1002003-03
1.4450000+00	-3.6310152+02	-1.9363918+02	1.0903434-03

REGION NUMBER 10

THERE ARE 2 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 ELLIPSE SEGMENT

PHI OR S	NTHETA	NPHI	OMEGATH
1.4450000+00	-3.6310149+02	-1.9363919+02	1.0703387-03
1.4510000+00	-3.6525077+02	-1.9465084+02	1.0443507-03
1.4570000+00	-3.6732736+02	-1.9562886+02	9.9756639-04
1.4630000+00	-3.6932718+02	-1.9657127+02	9.5000624-04
1.4690000+00	-3.7124617+02	-1.9747608+02	9.0169301-04
1.4750000+00	-3.7308035+02	-1.9834133+02	8.5265176-04
1.4810000+00	-3.7482578+02	-1.9916512+02	8.0290982-04
1.4870000+00	-3.7647863+02	-1.9994557+02	7.5249680-04
1.4930000+00	-3.7803522+02	-2.0068087+02	7.0144440-04
1.4990000+00	-3.7949195+02	-2.0136928+02	6.4978650-04
1.5050000+00	-3.8084544+02	-2.0200913+02	5.9755898-04

SEGMENT NUMBER 2 SEGMENT CODE 11 ELLIPSE SEGMENT

PHIS OR S	NTHETA	NPHI	OMEGATH
1.5050000+00	-3.8084540+02	-2.0200913+02	5.9755240-04
1.5128952+00	-3.8246360+02	-2.0277445+02	5.2602142-04
1.5207903+00	-3.8389059+02	-2.0344964+02	4.5766135-04
1.5286855+00	-3.8512020+02	-2.0403170+02	3.8657143-04
1.5365806+00	-3.8614702+02	-2.0451801+02	3.1485883-04
1.5444758+00	-3.8696650+02	-2.0490633+02	2.4264022-04
1.5523710+00	-3.8757497+02	-2.0519486+02	1.7004382-04
1.5602661+00	-3.8796981+02	-2.0538227+02	9.7211258-05
1.5681613+00	-3.8814947+02	-2.0546765+02	2.4298270-05
1.5707930+00	-3.8816144+02	-2.0547336+02	4.7766427-09

BOUNDARY CONDITIONS

JOINT	DELTA T	DELTA Z	DELTA R	THETA	ANGLE ALPHA
1	0	0	0	0	.0000000
2	1	1	1	1	.0000000
3	1	1	1	1	.0000000
4	1	1	1	1	.0000000
5	1	1	1	1	.0000000
6	1	1	1	1	.0000000
7	1	1	1	1	.0000000
8	1	1	1	1	.0000000
9	1	1	1	1	.0000000
10	1	1	1	1	.0000000
11	1	0	1	0	.0000000

HARMONIC (N) = 2

ESTIMATE)

EIGENVALUES

1.552075+00	8.467853+00	1.264438+01	1.737901+01	2.044594+01	2.620516+01	2.748276+01	3.212890+01
4.000729+01	5.390960+01	7.686406+01	8.669375+01	1.277733+02	1.803571+02	2.683833+02	3.257922+02
4.695332+02	8.548339+02	1.169398+03	1.426632+03	2.248011+03	4.840957+03	6.497600+03	1.047844+04
1.157635+04	1.491523+04	2.358282+04	3.718372+04	8.889717+04	-1.834464+04	-3.776914+03	-1.495880+03
-1.161307+03	-8.797206+02	-7.958641+02	-6.788766+02	-5.436398+02	-4.414334+02		

THE CURRENT LOAD MULTIPLICATION FACTOR = 1.552075+00

EIGENVALUE UPPER LIMIT EXCEEDED IN THIS HARMONIC.

HARMONIC (N) = 3

ESTIMATE 1

EIGENVALUES

1.017252+00	3.238099+00	5.776899+00	9.980537+00	1.528876+01	1.956707+01	2.504225+01	3.949709+01
4.732714+01	5.727766+01	9.338487+01	1.105851+02	1.419740+02	2.331106+02	2.970008+02	3.631191+02
6.242476+02	9.487488+02	1.567835+03	1.874531+03	2.561637+03	5.681839+03	9.568030+03	1.315426+04
2.293693+04	2.730799+04	3.665841+04	6.936273+04	1.978222+05	-1.785326+04	-4.386276+03	-2.597765+03
-1.773848+03	-1.269619+03	-9.996363+02	-9.010916+02	-6.985440+02	-5.536098+02		

THE CURRENT LOAD MULTIPLICATION FACTOR = 1.017252+00

HARMONIC (N) = 3

ESTIMATE 2

EIGENVALUES

9.988679-01	3.181488+00	5.677950+00	9.809396+00	1.501795+01	1.923130+01	2.460923+01	3.882345+01
4.644938+01	5.629825+01	9.179542+01	1.085775+02	1.395558+02	2.291575+02	2.917026+02	3.569524+02
6.136710+02	9.326551+02	1.540365+03	1.842804+03	2.518311+03	5.487594+03	9.403446+03	1.292895+04
2.253906+04	2.683843+04	3.603991+04	6.816916+04	1.947597+05	-1.753863+04	-4.311330+03	-2.554120+03
-1.743825+03	-1.248101+03	-9.826734+02	-8.858170+02	-6.866814+02	-5.442116+02		

EIGENVECTOR 1

3.254444-08	-8.971143-08	-3.788988-08	2.250574-06	1.607392-07	-6.706208-07	-2.405527-07	8.531717-06
7.060683-07	-3.158383-06	-1.340260-06	2.427113-05	3.268676-06	-1.254542-05	-7.314476-06	6.259163-05
1.395113-05	-4.117856-05	-3.425034-05	1.446418-04	5.855987-05	-1.243328-04	-1.525416-04	3.219407-04
1.946735-04	-2.954041-04	-5.261264-04	6.080657-04	6.675054-04	-6.302302-04	-1.859556-03	1.047337-03
1.716752-03	-7.507808-04	-4.877977-03	1.074605-03	2.397032-03	-6.855357-03		

EIGENVECTOR 2

-4.089896-07	2.941574-07	4.253384-07	-7.992464-06	-1.682994-06	2.192431-06	1.972391-06	-3.015083-05
-5.626569-06	1.023348-05	7.917219-06	-8.482754-05	-1.924215-05	3.978724-05	3.362525-05	-2.130054-04
-6.402550-05	1.249054-04	1.337741-04	-4.648861-04	-2.145360-04	3.420202-04	5.135661-04	-9.047296-04
-5.598939-04	6.735628-04	1.465299-03	-1.265491-03	-1.148637-03	8.449043-04	3.273277-03	-5.433743-04
-4.857210-04	-1.689207-05	1.498383-03	1.799463-03	1.135148-03	-3.486786-03		

THE CURRENT LOAD MULTIPLICATION FACTOR = 1.016100+00

REGION NUMBER 1

THERE ARE 2 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 ELLIPSE SEGMENT

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
3.4091000-02	0.0000000	0.0000000	0.0000000	0.00000	0.0000000	0.0000000	0.0000000	0.00000
3.8181900-02	1.1066918-09	-8.4173213-10	2.8510131-10	1.29550-07	-1.7569188-08	9.1577758-09	-1.0496713-09	-4.70930-07
4.2272800-02	2.0889964-09	-1.6997848-09	1.0200495-09	2.22486-07	-3.1889844-08	2.0008708-08	-3.7556524-09	-8.05459-07
4.6363700-02	3.0269564-09	-2.5732903-09	2.1019397-09	2.99086-07	-4.4840390-08	3.1774166-08	-7.7391241-09	-1.07900-06
5.0454600-02	3.9639915-09	-3.4674637-09	3.4866141-09	3.69157-07	-5.7371053-08	4.4178434-08	-1.2837493-08	-1.32793-06
5.4545500-02	4.9254838-09	-4.3882302-09	5.1591619-09	4.37729-07	-6.9995413-08	5.7141040-08	-1.8995800-08	-1.57088-06
5.8636400-02	5.9273194-09	-5.3406873-09	7.1200537-09	5.07508-07	-8.3007369-08	7.0657253-08	-2.6215683-08	-1.81783-06
6.2727300-02	6.9801081-09	-6.3288018-09	9.3782309-09	5.80008-07	-9.6563960-08	8.4749775-08	-3.4529934-08	-2.07434-06
6.6818200-02	8.0914001-09	-7.3554876-09	1.1947489-08	6.56105-07	-1.1083710-07	9.9448931-08	-4.3989189-08	-2.34360-06
7.0909100-02	9.2669115-09	-8.4227751-09	1.4844510-08	7.36321-07	-1.2584093-07	1.1478472-07	-5.4654678-08	-2.62751-06
7.5000000-02	1.0511233-08	-9.5319819-09	1.8087754-08	8.20974-07	-1.4164702-07	1.3078387-07	-6.6594144-08	-2.92721-06

SEGMENT NUMBER 2 SEGMENT CODE 11 ELLIPSE SEGMENT

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
7.5000000-02	1.0511236-08	-9.5319856-09	1.8087757-08	8.20974-07	-1.4164703-07	1.3078388-07	-6.6594140-08	-2.92721-06
8.0000000-02	1.2131160-08	-1.0945663-08	2.2550564-08	9.30749-07	-1.6210925-07	1.5127213-07	-8.3022061-08	-3.31598-06
8.5000000-02	1.3865925-08	-1.2423507-08	2.7597170-08	1.04767-06	-1.8387731-07	1.7281861-07	-1.0159736-07	-3.73017-06
9.0000000-02	1.5721263-08	-1.3965183-08	3.3265975-08	1.17188-06	-2.0699148-07	1.9544928-07	-1.2246079-07	-4.17026-06
9.5000000-02	1.7702642-08	-1.5569735-08	3.9596189-08	1.30347-06	-2.3148533-07	2.1918382-07	-1.4575599-07	-4.63654-06
1.0000000-01	1.9815447-08	-1.7235703-08	4.6627659-08	1.44248-06	-2.5738861-07	2.4403685-07	-1.7162883-07	-5.12919-06
1.0500000-01	2.2065079-08	-1.8961209-08	5.4400778-08	1.58899-06	-2.8472892-07	2.7001889-07	-2.0022709-07	-5.64837-06
1.1000000-01	2.4457044-08	-2.0744019-08	6.2956451-08	1.74301-06	-3.1353283-07	2.9713721-07	-2.3170034-07	-6.19418-06
1.1500000-01	2.6996992-08	-2.2581590-08	7.2336083-08	1.90459-06	-3.4382658-07	3.2539643-07	-2.6619982-07	-6.76674-06
1.2000000-01	2.9690767-08	-2.4471160-08	8.2581584-08	2.07377-06	-3.7563654-07	3.5479901-07	-3.0387855-07	-7.36613-06
1.2400000-01	3.1960602-08	-2.6018645-08	9.1429906-08	2.21460-06	-4.0219416-07	3.7914481-07	-3.3641454-07	-7.86504-06
1.2500000-01	3.2544423-08	-2.6409473-08	9.3735386-08	2.25057-06	-4.0898950-07	3.8534564-07	-3.4489130-07	-7.99247-06

REGION NUMBER 2

THERE ARE 2 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 ELLIPSE SEGMENT

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
1.2500000-01	3.2544441-08	-2.6409503-08	9.3735379-08	2.25057-06	-4.0898964-07	3.8534575-07	-3.4489128-07	-7.99246-06
1.3050000-01	3.5875786-08	-2.8592826-08	1.0710480-07	2.45386-06	-4.4774611-07	4.2036141-07	-3.9404248-07	-8.71237-06
1.3600000-01	3.9417308-08	-3.0826618-08	1.2168298-07	2.66646-06	-4.8841183-07	4.5677381-07	-4.4762745-07	-9.46513-06
1.4150000-01	4.3178141-08	-3.3105859-08	1.3752879-07	2.88847-06	-5.3103306-07	4.9457454-07	-5.0586038-07	-1.02509-05
1.4700000-01	4.7167649-08	-3.5425231-08	1.5470201-07	3.11990-06	-5.7565583-07	5.3375504-07	-5.6895861-07	-1.10699-05
1.5250000-01	5.1396433-08	-3.7779115-08	1.7326341-07	3.36082-06	-6.2232655-07	5.7430648-07	-6.3714278-07	-1.19222-05
1.5800000-01	5.5874356-08	-4.0161604-08	1.9327477-07	3.61130-06	-6.7109242-07	6.1621957-07	-7.1063695-07	-1.28081-05
1.6350000-01	6.0612548-08	-4.2566499-08	2.1479895-07	3.87141-06	-7.2200177-07	6.5948454-07	-7.8966890-07	-1.37277-05
1.6900000-01	6.5622431-08	-4.4987314-08	2.3789994-07	4.14121-06	-7.7510430-07	7.0409106-07	-8.7447022-07	-1.46813-05
1.7450000-01	7.0915926-08	-4.7417276-08	2.6264292-07	4.42077-06	-8.3045131-07	7.5002824-07	-9.6527650-07	-1.56691-05
1.7890000-01	7.5363265-08	-4.9303094-08	2.8366413-07	4.65151-06	-8.7638048-07	7.8772835-07	-1.0424061-06	-1.64840-05
1.8000000-01	7.6505472-08	-4.9849320-08	2.8909431-07	4.71018-06	-8.8809578-07	7.9728457-07	-1.0623276-06	-1.66912-05

SEGMENT NUMBER 2 SEGMENT CODE 11 ELLIPSE SEGMENT

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
1.8000000-01	7.6505576-08	-4.9849435-08	2.8909427-07	4.71018-06	-8.8809614-07	7.9728498-07	-1.0623275-06	-1.66912-05
1.8600000-01	8.2956155-08	-5.2496287-08	3.1997837-07	5.03722-06	-9.5366575-07	8.5032764-07	-1.1756106-06	-1.78458-05
1.9200000-01	8.9792090-08	-5.5126903-08	3.5306600-07	5.37618-06	-1.0221088-06	9.0490936-07	-1.2969398-06	-1.90420-05
1.9800000-01	9.7031764-08	-5.7730903-08	3.8844897-07	5.72718-06	-1.0935020-06	9.6101280-07	-1.4266450-06	-2.02800-05
2.0400000-01	1.0469439-07	-6.0297479-08	4.2622117-07	6.09033-06	-1.1679254-06	1.0186198-06	-1.5650637-06	-2.15603-05
2.1000000-01	1.1280002-07	-6.2815381-08	4.6647874-07	6.46576-06	-1.2454620-06	1.0777113-06	-1.7125407-06	-2.28832-05
2.1600000-01	1.2136961-07	-6.5272914-08	5.0932012-07	6.85359-06	-1.3261984-06	1.1382675-06	-1.8694286-06	-2.42491-05
2.2200000-01	1.3042501-07	-6.7657925-08	5.5484615-07	7.25396-06	-1.4102243-06	1.2002676-06	-2.0360881-06	-2.56584-05
2.2800000-01	1.3998902-07	-6.9957796-08	6.0316025-07	7.66701-06	-1.4976333-06	1.2636900-06	-2.2128886-06	-2.71115-05
2.3400000-01	1.5008540-07	-7.2159434-08	6.5436844-07	8.09288-06	-1.5885225-06	1.3285122-06	-2.4002082-06	-2.86088-05
2.4000000-01	1.6073893-07	-7.4249257-08	7.0857950-07	8.53172-06	-1.6829928-06	1.3947109-06	-2.5984343-06	-3.01508-05

REGION NUMBER 3

THERE ARE 2 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 ELLIPSE SEGMENT

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
2.4000000-01	1.6073922-07	-7.4249613-08	7.0857946-07	8.53172-06	-1.6829940-06	1.3947121-06	-2.5984341-06	-3.01508-05
2.4700000-01	1.7390462-07	-7.6527750-08	7.7577009-07	9.06029-06	-1.7996379-06	1.4742449-06	-2.8440083-06	-3.20053-05
2.5400000-01	1.8790636-07	-7.8611129-08	8.4738249-07	9.60698-06	-1.9213371-06	1.5556670-06	-3.1056094-06	-3.39222-05
2.6100000-01	2.0278931-07	-8.0475554-08	9.2360496-07	1.01720-05	-2.0482987-06	1.6389223-06	-3.3839073-06	-3.59023-05
2.6800000-01	2.1860055-07	-8.2095832-08	1.0046319-06	1.07558-05	-2.1807332-06	1.7239559-06	-3.6795921-06	-3.79464-05
2.7500000-01	2.3538937-07	-8.3445737-08	1.0906642-06	1.13584-05	-2.3188563-06	1.8107138-06	-3.9933750-06	-4.00554-05
2.8200000-01	2.5320743-07	-8.4497978-08	1.1819093-06	1.19803-05	-2.4628892-06	1.8991421-06	-4.3259894-06	-4.22300-05
2.8900000-01	2.7210885-07	-8.5224173-08	1.2785819-06	1.26218-05	-2.6130601-06	1.9891867-06	-4.6781921-06	-4.44711-05
2.9600000-01	2.9215029-07	-8.5594814-08	1.3809040-06	1.32831-05	-2.7696046-06	2.0807927-06	-5.0507639-06	-4.67796-05
3.0300000-01	3.1339108-07	-8.5579224-08	1.4891052-06	1.39646-05	-2.9327665-06	2.1739045-06	-5.4445117-06	-4.91565-05
3.0860000-01	3.3128889-07	-8.5267287-08	1.5800588-06	1.45245-05	-3.0682301-06	2.2494399-06	-5.7753155-06	-5.11079-05
3.1000000-01	3.3589333-07	-8.5145528-08	1.6034236-06	1.46666-05	-3.1027985-06	2.2684651-06	-5.8602685-06	-5.16027-05

SEGMENT NUMBER 2 SEGMENT CODE 11 ELLIPSE SEGMENT

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
3.1000000-01	3.3589419-07	-8.5146489-08	1.6034234-06	1.46666-05	-3.1028015-06	2.2684686-06	-5.8602674-06	-5.16027-05
3.1800000-01	3.6323916-07	-8.4096288-08	1.7418795-06	1.54945-05	-3.3058728-06	2.3782371-06	-6.3634738-06	-5.44845-05
3.2600000-01	3.9241873-07	-8.2405210-08	1.8890294-06	1.63502-05	-3.5186677-06	2.4897323-06	-6.8978852-06	-5.74598-05
3.3400000-01	4.2354024-07	-8.0019499-08	2.0452712-06	1.72343-05	-3.7416122-06	2.6028621-06	-7.4648864-06	-6.05301-05
3.4200000-01	4.5671678-07	-7.6883053-08	2.2110198-06	1.81474-05	-3.9751516-06	2.7175306-06	-8.0659175-06	-6.36970-05
3.5000000-01	4.9206749-07	-7.2937311-08	2.3867080-06	1.90901-05	-4.2197520-06	2.8336390-06	-8.7024767-06	-6.69623-05
3.5800000-01	5.2971782-07	-6.8121175-08	2.5727876-06	2.00631-05	-4.4759009-06	2.9510846-06	-9.3761230-06	-7.03278-05
3.6600000-01	5.6979993-07	-6.2370897-08	2.7697299-06	2.10670-05	-4.7441089-06	3.0697610-06	-1.0088480-05	-7.37951-05
3.7400000-01	6.1245299-07	-5.5619974-08	2.9780275-06	2.21025-05	-5.0249106-06	3.1895578-06	-1.0841237-05	-7.73662-05
3.8200000-01	6.5782361-07	-4.7799035-08	3.1981946-06	2.31703-05	-5.3188660-06	3.3103602-06	-1.1636156-05	-8.10431-05
3.9000000-01	7.0606619-07	-3.8835729-08	3.4307692-06	2.42712-05	-5.6265616-06	3.4320493-06	-1.2475074-05	-8.48276-05

REGION NUMBER 4

THERE ARE 2 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 ELLIPSE SEGMENT

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
3.9000000-01	7.0606828-07	-3.8838266-08	3.4307685-06	2.42711-05	-5.6265695-06	3.4320582-06	-1.2475071-05	-8.48275-05
3.9900000-01	7.6397537-07	-2.7294364-08	3.7079463-06	2.55501-05	-5.9996354-06	3.5726749-06	-1.3473749-05	-8.92007-05
4.0800000-01	8.2596634-07	-1.4096622-08	4.0023796-06	2.68731-05	-6.3912579-06	3.7145575-06	-1.4533265-05	-9.37208-05
4.1700000-01	8.9230676-07	8.7274752-10	4.3149521-06	2.82412-05	-6.8025117-06	3.8574634-06	-1.5656666-05	-9.83907-05
4.2600000-01	9.6326595-07	1.7737231-08	4.6465949-06	2.96558-05	-7.2345111-06	4.0011516-06	-1.6847143-05	-1.03213-04
4.3500000-01	1.0391380-06	3.6626290-08	4.9982885-06	3.11181-05	-7.6864155-06	4.1453815-06	-1.8108045-05	-1.08192-04
4.4400000-01	1.1202326-06	5.7675658-08	5.3710667-06	3.26294-05	-8.1654335-06	4.2899101-06	-1.9442882-05	-1.13330-04
4.5300000-01	1.2068786-06	8.1027637-08	5.7660190-06	3.41913-05	-8.6668289-06	4.4344912-06	-2.0855341-05	-1.18630-04
4.6200000-01	1.2994248-06	1.0683144-07	6.1842953-06	3.58052-05	-9.1939240-06	4.5788742-06	-2.2349295-05	-1.24097-04
4.7100000-01	1.3982415-06	1.3524352-07	6.6271089-06	3.74726-05	-9.7481062-06	4.7228021-06	-2.3928812-05	-1.29733-04
4.7820000-01	1.4820730-06	1.5996113-07	6.9998851-06	3.88461-05	-1.0211930-05	4.8374402-06	-2.5256900-05	-1.34367-04
4.8000000-01	1.5037218-06	1.6642794-07	7.0957408-06	3.91951-05	-1.0330831-05	4.8660117-06	-2.5598171-05	-1.35543-04

SEGMENT NUMBER 2 SEGMENT CODE 11 ELLIPSE SEGMENT

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
4.8000000-01	1.5037271-06	1.6642167-07	7.0957383-06	3.91950-05	-1.0330850-05	4.8660335-06	-2.5598162-05	-1.35543-04
4.9000000-01	1.6292510-06	2.0453222-07	7.6483686-06	4.11756-05	-1.1013661-05	5.0239821-06	-2.7563851-05	-1.42207-04
5.0000000-01	1.7641280-06	2.4652626-07	8.2365133-06	4.32286-05	-1.1735613-05	5.1803243-06	-2.9652524-05	-1.49096-04
5.1000000-01	1.9090106-06	2.9266554-07	8.8622655-06	4.53567-05	-1.2499650-05	5.3346611-06	-3.1871072-05	-1.56215-04
5.2000000-01	2.0645973-06	3.4322612-07	9.5278531-06	4.75625-05	-1.3307653-05	5.4865784-06	-3.4226791-05	-1.63570-04
5.3000000-01	2.2316350-06	3.9849922-07	1.0235648-05	4.98487-05	-1.4162450-05	5.6356452-06	-3.6727405-05	-1.71168-04
5.4000000-01	2.4109239-06	4.5879206-07	1.0988178-05	5.22182-05	-1.5066830-05	5.7814128-06	-3.9381098-05	-1.79015-04
5.5000000-01	2.6033262-06	5.2442881-07	1.1788137-05	5.46740-05	-1.6023749-05	5.9234142-06	-4.2196540-05	-1.87116-04
5.6000000-01	2.8097415-06	5.9575158-07	1.2638397-05	5.72193-05	-1.7036346-05	6.0611626-06	-4.5182917-05	-1.95477-04
5.7000000-01	3.0311709-06	6.7312151-07	1.3542024-05	5.98574-05	-1.8107951-05	6.1941510-06	-4.8349968-05	-2.04105-04
5.7800000-01	3.2198256-06	7.3962691-07	1.4305542-05	6.20370-05	-1.9010090-05	6.2967603-06	-5.1020606-05	-2.11204-04
5.8000000-01	3.2686618-06	7.5691983-07	1.4502290-05	6.25918-05	-1.9242101-05	6.3218511-06	-5.1708009-05	-2.13006-04

REGION NUMBER 5

THERE ARE 2 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 ELLIPSE SEGMENT

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
5.8000000-01	3.2686747-06	7.5670468-07	1.4502283-05	6.25916-05	-1.9242146-05	6.3219040-06	-5.1707979-05	-2.13005-04
5.9000000-01	3.5233505-06	8.4753508-07	1.5522680-05	6.54260-05	-2.0482956-05	6.4523043-06	-5.5266896-05	-2.22060-04
6.0000000-01	3.7964297-06	9.4542193-07	1.6606946-05	6.83640-05	-2.1792891-05	6.5783963-06	-5.9037799-05	-2.31452-04
6.1000000-01	4.0692126-06	1.0510143-06	1.7759071-05	7.14098-05	-2.3176565-05	6.6994891-06	-6.3033825-05	-2.41189-04
6.2000000-01	4.4030948-06	1.1647867-06	1.8983327-05	7.45675-05	-2.4638844-05	6.8148855-06	-6.7248888-05	-2.51275-04
6.3000000-01	4.7395749-06	1.2872405-06	2.0284281-05	7.78416-05	-2.6184863-05	6.9238791-06	-7.1757728-05	-2.61716-04
6.4000000-01	5.1002626-06	1.4189055-06	2.1666826-05	8.12366-05	-2.7820049-05	7.0257515-06	-7.6515985-05	-2.72519-04
6.5000000-01	5.4868878-06	1.5603422-06	2.3136204-05	8.47573-05	-2.9550146-05	7.1197695-06	-8.1560250-05	-2.83691-04
6.6000000-01	5.9013103-06	1.7121426-06	2.4698029-05	8.84088-05	-3.1381235-05	7.2051832-06	-8.6908137-05	-2.95238-04
6.7000000-01	6.3455299-06	1.8749332-06	2.6358323-05	9.21965-05	-3.3319763-05	7.2812241-06	-9.2578348-05	-3.07167-04
6.8000000-01	6.8216985-06	2.0493765-06	2.8123547-05	9.61258-05	-3.5372563-05	7.3471034-06	-9.8590745-05	-3.19485-04

SEGMENT NUMBER 2 SEGMENT CODE 11 ELLIPSE SEGMENT

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
6.8000000-01	6.8217267-06	2.0493438-06	2.8123526-05	9.61255-05	-3.5372661-05	7.3472143-06	-9.8590667-05	-3.19483-04
6.9000000-01	7.3321594-06	2.2361403-06	3.0000604-05	1.00202-04	-3.7546983-05	7.4021235-06	-1.0496631-04	-3.32195-04
7.0000000-01	7.8793510-06	2.4360316-06	3.1996988-05	1.04433-04	-3.9850524-05	7.4452291-06	-1.1172763-04	-3.45307-04
7.1000000-01	8.4659874-06	2.6498023-06	3.4120675-05	1.08823-04	-4.2291453-05	7.4756764-06	-1.1889838-04	-3.58824-04
7.2000000-01	9.0949635-06	2.8782828-06	3.6380263-05	1.13380-04	-4.4878442-05	7.4925880-06	-1.2660381-04	-3.72750-04
7.3000000-01	9.7693996-06	3.1223520-06	3.8784998-05	1.18111-04	-4.7620700-05	7.4950649-06	-1.3467066-04	-3.87087-04
7.4000000-01	1.0492662-05	3.3829401-06	4.1344826-05	1.23023-04	-5.0528006-05	7.4821878-06	-1.4312729-04	-4.01837-04
7.5000000-01	1.1268381-05	3.6610322-06	4.4070455-05	1.28124-04	-5.3610745-05	7.4530195-06	-1.5220369-04	-4.16998-04
7.6000000-01	1.2100477-05	3.9576710-06	4.6973416-05	1.33422-04	-5.6879946-05	7.4066089-06	-1.6183161-04	-4.32565-04
7.7000000-01	1.2993182-05	4.2739609-06	5.0066136-05	1.38925-04	-6.0347316-05	7.3419956-06	-1.7204453-04	-4.48533-04
7.8000000-01	1.3951069-05	4.6110710-06	5.3362007-05	1.44643-04	-6.4025288-05	7.2582173-06	-1.8287773-04	-4.64889-04

REGION NUMBER 6

THERE ARE 2 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 ELLIPSE SEGMENT

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
7.8000000-01	1.3951130-05	4.6110024-06	5.3361950-05	1.44642-04	-6.4025496-05	7.2584462-06	-1.8287749-04	-4.64886-04
7.9000000-01	1.4979121-05	4.9701698-06	5.6875402-05	1.50583-04	-6.8051363-05	7.1566062-06	-1.9435195-04	-4.80379-04
8.0000000-01	1.6082580-05	5.3527074-06	6.0622041-05	1.56758-04	-7.2316710-05	7.0417342-06	-2.0649831-04	-4.96753-04
8.1000000-01	1.7267284-05	5.7600032-06	6.4618693-05	1.63176-04	-7.6838073-05	6.9126958-06	-2.1936961-04	-5.13993-04
8.2000000-01	1.8539488-05	6.1935269-06	6.8883525-05	1.69849-04	-8.1633023-05	6.7691111-06	-2.3302191-04	-5.32084-04
8.3000000-01	1.9905960-05	6.6548344-06	7.3436173-05	1.76786-04	-8.6720220-05	6.6103628-06	-2.4751455-04	-5.51010-04
8.4000000-01	2.1374031-05	7.1455723-06	7.8297860-05	1.84001-04	-9.2119456-05	6.4358034-06	-2.6291030-04	-5.70756-04
8.5000000-01	2.2951641-05	7.6674836-06	8.3491536-05	1.91505-04	-9.7851703-05	6.2447635-06	-2.7927557-04	-5.91303-04
8.6000000-01	2.4647395-05	8.2224124-06	8.9042036-05	1.99311-04	-1.0393915-04	6.0365614-06	-2.9668056-04	-6.12627-04
8.7000000-01	2.6470625-05	8.8123086-06	9.4976237-05	2.07432-04	-1.1040526-04	5.8105134-06	-3.1519937-04	-6.34703-04
8.8000000-01	2.8431449-05	9.4392348-06	1.0132324-04	2.15882-04	-1.1727476-04	5.5659467-06	-3.3491008-04	-6.57493-04

SEGMENT NUMBER 2 SEGMENT CODE 11 ELLIPSE SEGMENT

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
8.8000000-01	2.8431582-05	9.4390912-06	1.0132305-04	2.15880-04	-1.1727521-04	5.5664023-06	-3.3490940-04	-6.57486-04
8.9000000-01	3.0540976-05	1.0105222-05	1.0811432-04	2.24673-04	-1.2457417-04	5.3020886-06	-3.5589377-04	-6.80945-04
9.0000000-01	3.2810857-05	1.0812863-05	1.1538405-04	2.33824-04	-1.3232997-04	5.0192207-06	-3.7823782-04	-7.05017-04
9.1000000-01	3.5254157-05	1.1564445-05	1.2316929-04	2.43350-04	-1.4057132-04	4.7154803-06	-4.0203092-04	-7.29628-04
9.2000000-01	3.7884920-05	1.2362531-05	1.3151020-04	2.53266-04	-1.4932826-04	4.3910629-06	-4.2736551-04	-7.54683-04
9.3000000-01	4.0718400-05	1.3209824-05	1.4045032-04	2.63590-04	-1.5863211-04	4.0457297-06	-4.5433635-04	-7.80062-04
9.4000000-01	4.3771167-05	1.4109171-05	1.5003693-04	2.74338-04	-1.6851543-04	3.6794772-06	-4.8303944-04	-8.05611-04
9.5000000-01	4.7061229-05	1.5063568-05	1.6032132-04	2.85529-04	-1.7901198-04	3.2926354-06	-5.1357040-04	-8.31134-04
9.6000000-01	5.0608159-05	1.6076164-05	1.7135916-04	2.97181-04	-1.9015665-04	2.8860022-06	-5.4602237-04	-8.56385-04
9.7000000-01	5.4433228-05	1.7150262-05	1.8321092-04	3.09313-04	-2.0198536-04	2.4610316-06	-5.8048301-04	-8.81053-04
9.7800000-01	5.7709020-05	1.8056145-05	1.9332227-04	3.19378-04	-2.1196559-04	2.1094061-06	-6.0955073-04	-9.00107-04
9.8000000-01	5.8559562-05	1.8289326-05	1.9594222-04	3.21946-04	-2.1453498-04	2.0200949-06	-6.1703046-04	-9.04746-04

REGION NUMBER 7

THERE ARE 2 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 ELLIPSE SEGMENT

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
9.8000000-01	5.8559869-05	1.8289013-05	1.9594157-04	3.21941-04	-2.1453599-04	2.0210391-06	-6.1702826-04	-9.04730-04
9.8800000-01	6.2094665-05	1.9249435-05	2.0680746-04	3.32421-04	-2.2527989-04	1.5469178-06	-6.4768686-04	-9.15929-04
9.9600000-01	6.5852199-05	2.0255677-05	2.1832110-04	3.43243-04	-2.3655198-04	1.0807408-06	-6.7957320-04	-9.29663-04
1.0040000+00	6.9847305-05	2.1309731-05	2.3052446-04	3.54419-04	-2.4837803-04	6.2938511-07	-7.1282636-04	-9.45757-04
1.0120000+00	7.4095838-05	2.2413652-05	2.4346235-04	3.65958-04	-2.6078517-04	1.9911281-07	-7.4758840-04	-9.64028-04
1.0200000+00	7.8614750-05	2.3569559-05	2.5718264-04	3.77871-04	-2.7380167-04	-2.0437829-07	-7.8400398-04	-9.84286-04
1.0280000+00	8.3422159-05	2.4779626-05	2.7173650-04	3.90169-04	-2.8745663-04	-5.7590771-07	-8.2221981-04	-1.00633-03
1.0360000+00	8.8537427-05	2.6046084-05	2.8717851-04	4.02862-04	-3.0177967-04	-9.1076886-07	-8.6238383-04	-1.02993-03
1.0440000+00	9.3981237-05	2.7371213-05	3.0356699-04	4.15962-04	-3.1680055-04	-1.2046862-06	-9.0464392-04	-1.05484-03
1.0520000+00	9.9775689-05	2.8757338-05	3.2096417-04	4.29478-04	-3.3254870-04	-1.4537897-06	-9.4914624-04	-1.08078-03
1.0600000+00	1.0594438-04	3.0206823-05	3.3943648-04	4.43419-04	-3.4905268-04	-1.6544609-06	-9.9603274-04	-1.10741-03

SEGMENT NUMBER 2 - SEGMENT CODE 11 ELLIPSE SEGMENT

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
1.0600000+00	1.0594490-04	3.0206347-05	3.3943526-04	4.43411-04	-3.4905431-04	-1.6531631-06	-9.9602921-04	-1.10739-03
1.0680000+00	1.1251302-04	3.1721554-05	3.5905311-04	4.57786-04	-3.6634131-04	-1.8020777-06	-1.0454333-03	-1.13432-03
1.0760000+00	1.1950746-04	3.3304909-05	3.7989235-04	4.72607-04	-3.8443620-04	-1.8961288-06	-1.0974784-03	-1.16110-03
1.0840000+00	1.2695687-04	3.4958824-05	4.0203352-04	4.87883-04	-4.0336095-04	-1.9322176-06	-1.1522694-03	-1.18715-03
1.0920000+00	1.3489180-04	3.6685701-05	4.2556244-04	5.03621-04	-4.2313369-04	-1.9069784-06	-1.2098857-03	-1.21179-03
1.1000000+00	1.4334481-04	3.8487915-05	4.5057044-04	5.19828-04	-4.4376781-04	-1.8165416-06	-1.2703705-03	-1.23417-03
1.1080000+00	1.5235052-04	4.0367795-05	4.7715472-04	5.36512-04	-4.6527106-04	-1.6559774-06	-1.3337174-03	-1.25325-03
1.1160000+00	1.6194578-04	4.2327600-05	5.0541860-04	5.53676-04	-4.8764464-04	-1.4185497-06	-1.3998526-03	-1.26772-03
1.1240000+00	1.7216972-04	4.4369491-05	5.3547179-04	5.71325-04	-5.1088261-04	-1.0946022-06	-1.4686116-03	-1.27599-03
1.1320000+00	1.8306389-04	4.6495503-05	5.6743072-04	5.89460-04	-5.3497148-04	-6.6993275-07	-1.5397099-03	-1.27607-03
1.1384000+00	1.9229129-04	4.8258144-05	5.9445266-04	6.04318-04	-5.5484154-04	-2.4381108-07	-1.5979816-03	-1.26862-03
1.1400000+00	1.9467232-04	4.8707508-05	6.0141876-04	6.08081-04	-5.5989057-04	-1.2344433-07	-1.6127045-03	-1.26553-03

REGION NUMBER 8

THERE ARE 2 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 ELLIPSE SEGMENT

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
1.1400000+00	1.9467346-04	4.8706559-05	6.0141522-04	6.06066-04	-5.5989389-04	-1.2107921-07	-1.6126956-03	-1.26549-03
1.1480000+00	2.0704373-04	5.1005910-05	6.3756263-04	6.27189-04	-5.8305802-04	-3.2150016-07	-1.6849572-03	-1.18110-03
1.1560000+00	2.2022420-04	5.3394275-05	6.7600857-04	6.46784-04	-6.0710122-04	-4.3533841-07	-1.7549644-03	-1.11755-03
1.1640000+00	2.3426688-04	5.5872788-05	7.1689827-04	6.66843-04	-6.3201227-04	-3.5589564-07	-1.8237665-03	-1.07276-03
1.1720000+00	2.4922655-04	5.8442219-05	7.6038460-04	6.87357-04	-6.5779781-04	4.8744785-09	-1.8923839-03	-1.04468-03
1.1800000+00	2.6516075-04	6.1102912-05	8.0662820-04	7.08309-04	-6.8447703-04	7.1803803-07	-1.9618014-03	-1.03129-03
1.1880000+00	2.8212983-04	6.3854714-05	8.5579747-04	7.29680-04	-7.1207571-04	1.8391437-06	-2.0329606-03	-1.03060-03
1.1960000+00	3.0019688-04	6.6696894-05	9.0806840-04	7.51447-04	-7.4061959-04	3.4094164-06	-2.1067506-03	-1.04066-03
1.2040000+00	3.1942768-04	6.9628059-05	9.6362441-04	7.73580-04	-7.7012665-04	5.4566240-06	-2.1839975-03	-1.05950-03
1.2120000+00	3.3989055-04	7.2646055-05	1.0226559-03	7.96043-04	-8.0059843-04	7.9955745-06	-2.2654482-03	-1.08506-03
1.2184000+00	3.5719537-04	7.5120975-05	1.0725156-03	8.14223-04	-8.2565486-04	1.0382648-05	-2.3340732-03	-1.10890-03
1.2200000+00	3.6165618-04	7.5747867-05	1.0853599-03	8.18794-04	-8.3200998-04	1.1028235-05	-2.3517476-03	-1.11517-03

SEGMENT NUMBER 2 SEGMENT CODE 11 ELLIPSE SEGMENT

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
1.2200000+00	3.6165901-04	7.5745847-05	1.0853519-03	8.18785-04	-8.3201699-04	1.1031618-05	-2.3517453-03	-1.11524-03
1.2280000+00	3.8480072-04	7.8927218-05	1.1519303-03	8.41772-04	-8.6430646-04	1.4547186-05	-2.4434065-03	-1.14742-03
1.2360000+00	4.0939293-04	8.2183246-05	1.2225918-03	8.64950-04	-8.9735979-04	1.8520861-05	-2.5407416-03	-1.17869-03
1.2440000+00	4.3551179-04	8.5507597-05	1.2975489-03	8.88254-04	-9.3099879-04	2.2914581-05	-2.6437939-03	-1.20529-03
1.2520000+00	4.6323435-04	8.8849258-05	1.3770165-03	9.11607-04	-9.6496563-04	2.7677452-05	-2.7522103-03	-1.22232-03
1.2600000+00	4.9263800-04	9.2329032-05	1.4612101-03	9.34925-04	-9.9890828-04	3.2748503-05	-2.8650616-03	-1.22319-03
1.2680000+00	5.2379970-04	9.5806111-05	1.5503441-03	9.58112-04	-1.0323685-03	3.8063342-05	-2.9805829-03	-1.19903-03
1.2760000+00	5.5679511-04	9.9311205-05	1.6446289-03	9.81060-04	-1.0647762-03	4.3567618-05	-3.0958058-03	-1.13782-03
1.2840000+00	5.9169754-04	1.0282975-04	1.7442683-03	1.00365-03	-1.0954560-03	4.9241785-05	-3.2060486-03	-1.02343-03
1.2920000+00	6.2857682-04	1.0634508-04	1.8494563-03	1.02574-03	-1.1236576-03	5.5143846-05	-3.3042258-03	-8.34418-04
1.2984000+00	6.5954738-04	1.0914242-04	1.9377232-03	1.04297-03	-1.1439229-03	6.0160404-05	-3.3672319-03	-6.10990-04
1.3000000+00	6.6749784-04	1.0983831-04	1.9603728-03	1.04720-03	-1.1486236-03	6.1479716-05	-3.3799386-03	-5.42900-04

REGION NUMBER 9

THERE ARE 2 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 ELLIPSE SEGMENT

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
1.3000000+00	6.6750538-04	1.0983435-04	1.9603764-03	1.04734-03	-1.1486366-03	6.1483312-05	-3.3800036-03	-5.43374-04
1.3080000+00	7.0853880-04	1.1328310-04	2.0772098-03	1.06819-03	-1.1509058-03	6.6949890-05	-3.4135090-03	-7.56950-05
1.3160000+00	7.5172326-04	1.1666440-04	2.2000925-03	1.08801-03	-1.1484133-03	7.2374448-05	-3.4021371-03	2.62142-04
1.3240000+00	7.9709866-04	1.1995234-04	2.3291302-03	1.10663-03	-1.1408591-03	7.8384760-05	-3.3569408-03	4.94396-04
1.3320000+00	8.4469238-04	1.2311828-04	2.4643936-03	1.12382-03	-1.1282692-03	8.5323323-05	-3.2873026-03	6.43814-04
1.3400000+00	8.9451699-04	1.2613088-04	2.6059118-03	1.13937-03	-1.1108849-03	9.3316660-05	-3.2008872-03	7.30745-04
1.3480000+00	9.4656782-04	1.2895602-04	2.7536645-03	1.15304-03	-1.0890645-03	1.0233605-04	-3.1037041-03	7.72604-04
1.3560000+00	1.0008204-03	1.3155695-04	2.9075743-03	1.16456-03	-1.0632004-03	1.1224769-04	-3.0002523-03	7.83676-04
1.3640000+00	1.0572280-03	1.3389428-04	3.0674974-03	1.17367-03	-1.0336486-03	1.2285117-04	-2.8937188-03	7.75216-04
1.3720000+00	1.1157187-03	1.3592608-04	3.2332153-03	1.18006-03	-1.0006721-03	1.3390559-04	-2.7861903-03	7.55851-04
1.3784000+00	1.1639456-03	1.3730182-04	3.3697614-03	1.18302-03	-9.7191222-04	1.4289522-04	-2.7002651-03	7.37040-04
1.3800000+00	1.1761936-03	1.3760800-04	3.4044252-03	1.18344-03	-9.6439181-04	1.4514413-04	-2.6788370-03	7.32265-04

SEGMENT NUMBER 2   SEGMENT CODE 11   ELLIPSE SEGMENT

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
1.3800000+00	1.1762068-03	1.3760882-04	3.4046592-03	1.18453-03	-9.6436523-04	1.4509735-04	-2.6797510-03	7.29401-04
1.3865000+00	1.2267128-03	1.3869257-04	3.5476983-03	1.18525-03	-9.3238561-04	1.5413520-04	-2.5933150-03	7.10393-04
1.3930000+00	1.2783552-03	1.3949342-04	3.6939059-03	1.18373-03	-8.9802702-04	1.6292340-04	-2.5071153-03	6.95579-04
1.3995000+00	1.3310323-03	1.3998672-04	3.8429956-03	1.17981-03	-8.6103233-04	1.7127914-04	-2.4204580-03	6.89063-04
1.4060000+00	1.3846262-03	1.4014786-04	3.9946341-03	1.17334-03	-8.2102574-04	1.7900793-04	-2.3319748-03	6.96555-04
1.4125000+00	1.4390026-03	1.3995243-04	4.1484393-03	1.16416-03	-7.7751128-04	1.8591030-04	-2.2392987-03	7.26281-04
1.4190000+00	1.4940106-03	1.3937649-04	4.3039791-03	1.15210-03	-7.2988496-04	1.9179938-04	-2.1385805-03	7.90031-04
1.4255000+00	1.5494819-03	1.3839679-04	4.4607705-03	1.13703-03	-6.7747106-04	1.9653655-04	-2.0238188-03	9.04250-04
1.4320000+00	1.6052320-03	1.3699096-04	4.6182796-03	1.11881-03	-6.1959914-04	2.0009498-04	-1.8859892-03	1.09105-03
1.4385000+00	1.6610598-03	1.3513779-04	4.7759233-03	1.09732-03	-5.5574500-04	2.0266369-04	-1.7119931-03	1.37880-03
1.4437000+00	1.7056333-03	1.3331976-04	4.9017134-03	1.07772-03	-5.0023822-04	2.0436750-04	-1.5346491-03	1.70464-03
1.4450000+00	1.7167492-03	1.3281740-04	4.9330717-03	1.07249-03	-4.8576774-04	2.0480754-04	-1.4835105-03	1.80189-03

REGION NUMBER 10

THERE ARE 2 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

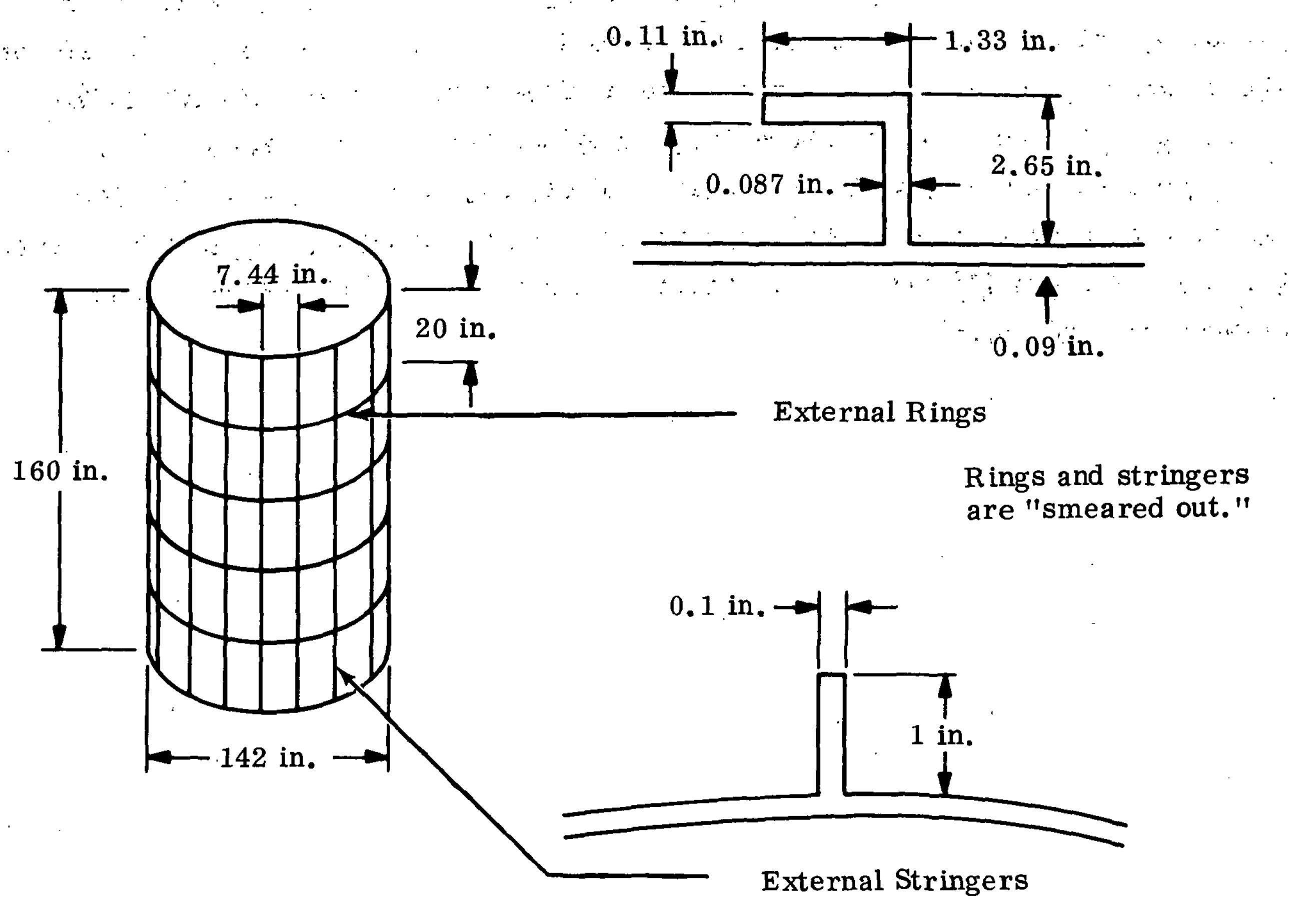
SEGMENT NUMBER 1 SEGMENT CODE 11 ELLIPSE SEGMENT

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
1.4450000+00	1.7167520-03	1.3283367-04	4.9336279-03	1.07461-03	-4.8572099-04	2.0475291-04	-1.4844234-03	1.79946-03
1.4510000+00	1.7676562-03	1.3027846-04	5.0780200-03	1.04954-03	-4.0839461-04	2.0655250-04	-1.2375535-03	1.82610-03
1.4570000+00	1.8184431-03	1.2730567-04	5.2209793-03	1.02139-03	-3.2714145-04	2.0797780-04	-9.8503366-04	1.82767-03
1.4630000+00	1.8683071-03	1.2390844-04	5.3619067-03	9.90136-04	-2.4262855-04	2.0877518-04	-7.2973081-04	1.81367-03
1.4690000+00	1.9172338-03	1.2008197-04	5.5001790-03	9.55756-04	-1.5548134-04	2.0868869-04	-4.7347474-04	1.79105-03
1.4750000+00	1.9650020-03	1.1582376-04	5.6351525-03	9.18241-04	-6.6272670-05	2.0747768-04	-2.1732090-04	1.76473-03
1.4810000+00	2.0113859-03	1.1113373-04	5.7661661-03	8.77594-04	2.4476893-05	2.0492787-04	3.8232126-05	1.73802-03
1.4870000+00	2.0561568-03	1.0601424-04	5.8925459-03	8.33832-04	1.1628987-04	2.0085792-04	2.9307529-04	1.71312-03
1.4930000+00	2.0990863-03	1.0047003-04	6.0136095-03	7.86992-04	2.0871594-04	1.9512384-04	5.4736943-04	1.69148-03
1.4990000+00	2.1399493-03	9.4507953-05	6.1286733-03	7.37136-04	3.0131025-04	1.8762292-04	8.0146384-04	1.67405-03
1.5050000+00	2.1785268-03	8.8136670-05	6.2370613-03	6.84383-04	3.9360664-04	1.7829873-04	1.0558363-03	1.66137-03

SEGMENT NUMBER 2 SEGMENT CODE 11 ELLIPSE SEGMENT

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
1.5050000+00	2.1784883-03	8.8197763-05	6.2383782-03	6.68423-04	3.9371362-04	1.7820430-04	1.0546353-03	1.65921-03
1.5128952+00	2.2253411-03	7.9282790-05	6.3707288-03	6.16671-04	5.1392873-04	1.6308624-04	1.3902556-03	1.64996-03
1.5207903+00	2.2673534-03	6.9763207-05	6.4893767-03	5.40829-04	6.3134996-04	1.4493813-04	1.7285031-03	1.64776-03
1.5286855+00	2.3040833-03	5.9697446-05	6.5930507-03	4.61196-04	7.4412435-04	1.2414596-04	2.0698161-03	1.64582-03
1.5365806+00	2.3351353-03	4.9151967-05	6.6805805-03	3.78127-04	8.4978557-04	1.0136085-04	2.4123148-03	1.62780-03
1.5444758+00	2.3601711-03	3.8198913-05	6.7509239-03	2.92050-04	9.4511323-04	7.7483770-05	2.7490432-03	1.56125-03
1.5523710+00	2.3789206-03	2.6913338-05	6.8031974-03	2.03500-04	1.0261196-03	5.3536686-05	3.0636280-03	1.38923-03
1.5602661+00	2.3911926-03	1.5370108-05	6.8367168-03	1.13187-04	1.0883226-03	3.0321560-05	3.3240626-03	1.02167-03
1.5681613+00	2.3968840-03	3.6410565-06	6.8510538-03	2.21034-05	1.1275455-03	7.7358446-06	3.4749453-03	3.29318-04
1.5707930+00	2.3973146-03	-2.9817315-07	6.8515429-03	-8.19742-06	1.1350257-03	6.0418073-08	3.4869223-03	-1.52519-06

The second stability test problem is presented in Figure 4-2. Actually the test problem involves only the panel buckling mode of the cylindrical shell, whereas the full stability analysis is discussed in Reference 1. The reinforced (smeared stringers) panel is loaded with a constant 31 psi. internal pressure, and a variable compressive end load to buckling. The input is set for the program to receive the prestress states from cards. There are two loading conditions: the constant pressure load , and the variable end compression. Since no axisymmetric static analysis is necessary, only one set of boundary conditions is sufficient. The input is set to include full intermediate output. Since it is known [1] that the critical harmonic is n=10, the search is set between n=9 and n=11.



Notes:

Loading
1) Compressive end load: N
2) Internal stabilizing pressure: 31 psi

Boundary Conditions
1) Ends are simply supported

Figure 4-2 Test Problem 2

```
  CYLINDER  PANEL  STABILITY TEST
 4  4 1 911 1 2 1 1 1
ALUM       STIF

 1.0       E 07
 1.0       E 07
  .3


 3.85      E 06
 1.0       E 07
 1.0       E 07

--------------------------------------------------------------------------------
 1 0
    1    1    2
31   SHUTTLE CYLINDER
 .5             1.0      E-04  .05                                       0.
 71.
STIF      ALUM       BLAN      ST11      NØTH      0.0     LINE          2
 1.0            6.0

 .1             .1
-.545          -.545
 .0380025       .0380025
 7.44           7.44
  1.0           1.0
  .09            .09
  2200.         2200.

-5.471    E 03-5.471    E 03
    1    1    2
--------------------------------------------------------------------------------
 1 0
    2    2    3
31   SHUTTLE CYLINDER
 .5             1.0      E-04  .05                                       0.
 71.
STIF      ALUM       BLAN      ST11      NØTH      0.0     NPHI          2
 1.0            6.0

 .1             .1
-.545          -.545
 .0380025       .0380025
 7.44           7.44
  1.0           1.0
  .09            .09
  2200.         2200.

-5.471    E 03-5.471    E 03
```

```
    1    1    2
-----------------------------------------------------------------------------
 1 0
    3    3    4
31   SHUTTLE CYLINDER
 .5              1.0      E-04  .05                                   0.
 71.
STIF      ALUM       BLAN      ST11      NØTH        0.0      NPHI       2
 1.0             6.0

 .1              .1
-.545           -.545
 .0380025        .0380025
 7.44            7.44
  1.0            1.0
  .09             .09
  2200.          2200.

-5.471    E 03-5.471    E 03
    1    1    2
-----------------------------------------------------------------------------
 1 0
    4    4    5
31   SHUTTLE CYLINDER
 .5              1.0      E-04  .05                                   0.
 71.
STIF      ALUM       BLAN      ST11      NØTH        0.0      NPHI       2
 1.0             6.0

 .1              .1
-.545           -.545
 .0380025        .0380025
 7.44            7.44
  1.0            1.0
  .09             .09
  2200.          2200.

-5.471    E 03-5.471    E 03
    1    1    2
-----------------------------------------------------------------------------
    5    0
 1 0 1 0 1
 2 1 1 1 1
 3 1 0 1 1
 4 1 1 1 1
 5 0 1 0 1
-----------------------------------------------------------------------------
 FIN
```

UNSYMMETRIC, ORTHOTROPIC, REINFORCED SHELL ANALYSIS WITH COUPLING OF AT MOST 29 SHELL REGIONS

STARS-2B

AS OF NOVEMBER 1, 1972

NUMBER OF SEGMENTS = 4 NUMBER OF REGIONS = 4 NUMBER OF MATERIAL PROPERTY TABLES USED = 1 NUMBER OF PROBLEMS = 2

NUMBER OF BOUNDARY CONDITION MATRICES = 1

STABILITY HARMONICS (N) = 9 TO 11 INCREMENTED BY 1

THE GIVEN INPUT INDICATES THAT THE PREBUCKLING STATE WILL BE PROVIDED

CYLINDER PANEL STABILITY TEST

FOR INFORMATION CALL V. SVALBONAS (516) 575-7701
P. OGILVIE

REGION NUMBER 1

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 31 SHUTTLE CYLINDER

DTAU	DIFF	STEP	DELTA
.5000000+00	.1000000-03	.5000000-01	.0000000

GEOMETRY INPUT VARIABLES

.7100000+02	.0000000	.0000000

STIF ALUM BLAN STI1 NOTH T FREE = .000 NUMBER OF TABLE COLUMNS = 2

MATERIAL PROPERTY TABLE USED

.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.10000+08	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.10000+08	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.30000+00	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.38500+07	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.10000+08	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.10000+08	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000

TABLE ORDER PHI OR S VS. CROSSECTION PROPERTIES

.1000000+01	.6000000+01
.0000000	.0000000
.0000000	.0000000
.1000000+00	.1000000+00
.0000000	.0000000
-.5450000+00	-.5450000+00
.0000000	.0000000
.3800250-01	.3800250-01
.0000000	.0000000
.7440000+01	.7440000+01
.1000000+01	.1000000+01
.9000000-01	.9000000-01

TABLE ORDER PHI OR S VS. INPUT STRESS RESULTANTS

.2200000+04	.2200000+04
.0000000	.0000000
.0000000	.0000000
-.5471000+04	-.5471000+04

MATRIX X AND Y (TRANSPOSED) MAGIC OUTPUT

.0000000	.0000000	.0000000	.0000000	.1000000+01	.0000000	.0000000	.0000000
.0000000	.0000000	.0000000	.0000000	.0000000	.1000000+01	.0000000	.0000000
.0000000	.0000000	.8350032+03	.2169977+04	.0000000	.2468605-01	.8306464+00	-.1057967+00
.0000000	.0000000	.2169977+04	.3666259+04	.0000000	.5667599-01	.4781833+01	.8306464+00
.1000000+01	.0000000	.0000000	.0000000	.1443001-04	.0000000	.0000000	.0000000
.0000000	.1000000+01	-.2468605-01	-.5667599-01	.0000000	.4668953-05	-.1478327-04	-.4851949-05
.0000000	.0000000	.8306464+00	.4781833+01	.0000000	.1478327-04	-.4359004-03	-.2579998-03
.0000000	.0000000	-.1057967+00	.8306464+00	.0000000	.4851949-05	-.2579998-03	-.9927783-04

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.3091516+08	.0000000	.0000000	.0000000	-.3091516+08	.0000000	.0000000	.0000000
FORCZ1	.0000000	.1002040+09	.9287349+06	-.7310779+07	.0000000	-.1002040+09	.9287349+06	.7310779+07
FORCR1	.0000000	.9287349+06	.2111123+07	-.5056305+07	.0000000	-.9287349+06	-.1893110+07	-.4874360+07
MOME 1	.0000000	-.7310779+07	-.5056305+07	.1722997+08	.0000000	.7310779+07	.4874360+07	.7816511+07
FORCT2	-.3091516+08	.0000000	.0000000	.0000000	.3091516+08	.0000000	.0000000	.0000000
FORCZ2	.0000000	-.1002040+09	-.9287349+06	.7310779+07	.0000000	.1002040+09	-.9287349+06	-.7310779+07
FORCR2	.0800000	.9287349+06	-.1893110+07	.4874360+07	.0000000	-.9287349+06	.2111123+07	.5056305+07
MOME 2	.0000000	.7310779+07	-.4874360+07	.7816511+07	.0000000	-.7310779+07	.5056305+07	.1722997+08

SEGMENT SYMMETRY CHECK

.3091516+08	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1002040+09	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.2111123+07	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1722997+08	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.3091516+08	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1002040+09	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.2111123+07	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1722997+08

RZERO(I) = 7.100000+01 RZERO(J) = 7.100000+01

REGION NUMBER 2

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 31 SHUTTLE CYLINDER

DTAU	DIFF	STEP	DELTA
.5000000+00	.7000000-03	.5000000-01	.0000000

GEOMETRY INPUT VARIABLES

.7100000+02 .0000000 .0000000

STIF ALUM BLAN STII NOTH T FREE = .000 NUMBER OF TABLE COLUMNS = 2

MATERIAL PROPERTY TABLE USED

.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.10000+08	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.10000+08	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.30000+00	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.38500+07	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.10000+08	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.10000+08	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000

TABLE ORDER PHI OR S VS. CROSSECTION PROPERTIES

.1000000+01	.6000000+01
.0000000	.0000000
.0000000	.0000000
.1000000+00	.1000000+00
.0000000	.0000000
-.5450000+00	-.5450000+00
.0000000	.0000000
.3800250-01	.3800250-01
.0000000	.0000000
.7440000+01	.7440000+01
.1000000+01	.1000000+01
.9000000-01	.9000000-01

TABLE ORDER PHI OR S VS. INPUT STRESS RESULTANTS

.2200000+04	.2200000+04
.0000000	.0000000
.0000000	.0000000
-.5471000+04	-.5471000+04

MATRIX X AND Y (TRANSPOSED) MAGIC OUTPUT

.0000000	.0000000	.0000000	.0000000	.1000000+01	.0000000	.0000000	.0000000
.0000000	.0000000	.0000000	.0000000	.0000000	.1000000+01	.0000000	.0000000
.0000000	.0000000	.8350032+03	.2169977+04	.0000000	.2468605-01	.8306464+00	-.1057967+00
.0000000	.0000000	.2169977+04	.3666259+04	.0000000	.5667599-01	.4781833+01	.8306464+00
.1000000+01	.0000000	.0000000	.0000000	.1443001-09	.0000000	.0000000	.0000000
.0000000	.1000000+01	-.2468605-01	-.5667599-01	.0000000	.4668953-05	-.1478327-04	-.4851949-05
.0000000	.0000000	.8306464+00	.4781833+01	.0000000	.1478327-04	-.4359009-03	-.2579998-03
.0000000	.0000000	-.1057967+00	.8306464+00	.0000000	.4851949-05	-.2579998-03	-.9927783-04

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.3091516+08	.0000000	.0000000	.0000000	-.3091516+08	.0000000	.0000000	.0000000
FORCZ1	.0000000	.1002040+09	.9287349+06	-.7310779+07	.0000000	-.1002040+09	.9287349+06	.7310779+07
FORCR1	.0000000	.9287349+06	.2111123+07	-.5056305+07	.0000000	-.9287349+06	-.1893110+07	-.4874360+07
MOME 1	.0000000	-.7310779+07	-.5056305+07	.1722997+08	.0000000	.7310779+07	.4874360+07	.7816511+07
FORCT2	-.3091516+08	.0000000	.0000000	.0000000	.3091516+08	.0000000	.0000000	.0000000
FORCZ2	.0000000	-.1002040+09	-.9287349+06	.7310779+07	.0000000	.1002040+09	-.9287349+06	-.7310779+07
FORCR2	.0000000	.9287349+06	-.1893110+07	.4874360+07	.0000000	-.9287349+06	.2111123+07	.5056305+07
MOME 2	.0000000	.7310779+07	-.4874360+07	.7816511+07	.0000000	-.7310779+07	.5056305+07	.1722997+08

SEGMENT SYMMETRY CHECK

.3091516+08	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1002040+09	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.2111123+07	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1722997+08	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.3091516+08	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1002040+09	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.2111123+07	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1722997+08

RZERO(I) = 7.100000+01 RZERO(J) = 7.100000+01

REGION NUMBER 3

THERE ARE 1 SEGMENTS AND .0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 31 SHUTTLE CYLINDER

DTAU	DIFF	STEP	DELTA
.5000000+00	.1000000-03	.5000000-01	.0000000

GEOMETRY INPUT VARIABLES

.7100000+02	.0000000	.0000000

STIF ALUM BLAN STI1 NOTH T FREE = .000 NUMBER OF TABLE COLUMNS = 2

MATERIAL PROPERTY TABLE USED

.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.10000+08	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.10000+08	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.30000+00	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.38500+07	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.10000+08	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.10000+08	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000

TABLE ORDER PHI OR S VS. CROSSECTION PROPERTIES

.1000000+01	.6000000+01
.0000000	.0000000
.0000000	.0000000
.1000000+00	.1000000+00
.0000000	.0000000
-.5450000+00	-.5450000+00
.0000000	.0000000
.3800250-01	.3800250-01
.0000000	.0000000
.7440000+01	.7440000+01
.1000000+01	.1000000+01
.9000000-01	.9000000-01

TABLE ORDER PHI OR S VS. INPUT STRESS RESULTANTS

.2200000+04	.2200000+04
.0000000	.0000000
.0000000	.0000000
-.5471000+04	-.5471000+04

MATRIX X AND Y (TRANSPOSED) MAGIC OUTPUT

.0000000	.0000000	.0000000	.0000000	.1000000+01	.0000000	.0000000	.0000000
.0000000	.0000000	.0000000	.0000000	.0000000	.1000000+01	.0000000	.0000000
.0000000	.0000000	.8350032+03	.2169977+04	.0000000	.2468605-01	.8306464+00	-.1057967+00
.0000000	.0000000	.2169977+04	.3666259+04	.0000000	.5667599-01	.4781833+01	.8306464+00
.1000000+01	.0000000	.0000000	.0000000	.1443001-04	.0000000	.0000000	.0000000
.0000000	.1000000+01	-.2468605-01	-.5667599-01	.0000000	.4668953-05	-.1478327-04	-.4851949-05
.0000000	.0000000	.8306464+00	.4781833+01	.0000000	.1478327-04	-.4359004-03	-.2579998-03
.0000000	.0000000	-.1057967+00	.8306464+00	.0000000	.4851949-05	-.2579998-03	-.9927783-04

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.3091516+08	.0000000	.0000000	.0000000	-.3091516+08	.0000000	.0000000	.0000000
FORCZ1	.0000000	.1002040+09	.9287349+06	-.7310779+07	.0000000	-.1002040+09	.9287349+06	.7310779+07
FORCR1	.0000000	.9287349+06	.2111123+07	-.5056305+07	.0000000	-.9287349+06	-.1893110+07	-.4874360+07
MOME 1	.0000000	-.7310779+07	-.5056305+07	.1722997+08	.0000000	.7310779+07	.4874360+07	.7816511+07
FORCT2	-.3091516+08	.0000000	.0000000	.0000000	.3091516+08	.0000000	.0000000	.0000000
FORCZ2	.0000000	-.1002040+09	-.9287349+06	.7310779+07	.0000000	.1002040+09	-.9287349+06	-.7310779+07
FORCR2	.0000000	.9287349+06	-.1893110+07	.4874360+07	.0000000	-.9287349+06	.2111123+07	.5056305+07
MOME 2	.0000000	.7310779+07	-.4874360+07	.7816511+07	.0000000	-.7310779+07	.5056305+07	.1722997+08

SEGMENT SYMMETRY CHECK

.3091516+08	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1002040+09	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.2111123+07	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1722997+08	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.3091516+08	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1002040+09	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.2111123+07	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1722997+08

RZERO(I) = 7.100000+01 RZERO(J) = 7.100000+01

REGION NUMBER 4

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 31 SHUTTLE CYLINDER

DTAU	DIFF	STEP	DELTA
.5000000+00	.1000000-03	.5000000-01	.0000000

GEOMETRY INPUT VARIABLES

.7100000+02	.0000000	.0000000

STIF ALUM BLAN STI1 NOTH T FREE = .000 NUMBER OF TABLE COLUMNS = 2

MATERIAL PROPERTY TABLE USED

.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.10000+08	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.10000+08	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.30000+00	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.38500+07	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.10000+08	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.10000+08	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000

TABLE ORDER PHI OR S VS. CROSSECTION PROPERTIES

.1000000+01	.6000000+01
.0000000	.0000000
.0000000	.0000000
.1000000+00	.1000000+00
.0000000	.0000000
-.5450000+00	-.5450000+00
.0000000	.0000000
.3800250-01	.3800250-01
.0000000	.0000000
.7440000+01	.7440000+01
.1000000+01	.1000000+01
.9000000-01	.9000000-01

TABLE ORDER PHI OR S VS. INPUT STRESS RESULTANTS

.2200000+04	.2200000+04
.0000000	.0000000
.0000000	.0000000
-.5471000+04	-.5471000+04

MATRIX X AND Y (TRANSPOSED) MAGIC OUTPUT

.0000000	.0000000	.0000000	.0000000	.1000000+01	.0000000	.0000000	.0000000
.0000000	.0000000	.0000000	.0000000	.0000000	.1000000+01	.0000000	.0000000
.0000000	.0000000	.8350032+03	.2169977+04	.0000000	.2468605-01	.8306464+00	-.1057967+00
.0000000	.0000000	.2169977+04	.3666259+04	.0000000	.5667599-01	.4781833+01	.8306464+00
.1000000+01	.0000000	.0000000	.0000000	.1443001-04	.0000000	.0000000	.0000000
.0000000	.1000000+01	-.2468605-01	-.5667599-01	.0000000	.4668953-05	-.1478327-04	-.4851949-05
.0000000	.0000000	.8306464+00	.4781833+01	.0000000	.1478327-04	-.4359004-03	-.2579998-03
.0000000	.0000000	-.1057967+00	.8306464+00	.0000000	.4851949-05	-.2579998-03	-.9927783-04

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.3091516+08	.0000000	.0000000	.0000000	-.3091516+08	.0000000	.0000000	.0000000
FORCZ1	.0000000	.1002040+09	.9287349+06	-.7310779+07	.0000000	-.1002040+09	.9287349+06	.7310779+07
FORCR1	.0000000	.9287349+06	.2111123+07	-.5056305+07	.0000000	-.9287349+06	-.1893110+07	-.4874360+07
MOME 1	.0000000	-.7310779+07	-.5056305+07	.1722997+08	.0000000	.7310779+07	.4874360+07	.7816511+07
FORCT2	-.3091516+08	.0000000	.0000000	.0000000	.3091516+08	.0000000	.0000000	.0000000
FORCZ2	.0000000	-.1002040+09	-.9287349+06	.7310779+07	.0000000	.1002040+09	-.9287349+06	-.7310779+07
FORCR2	.0000000	.9287349+06	-.1893110+07	.4874360+07	.0000000	-.9287349+06	.2111123+07	.5056305+07
MOME 2	.0000000	.7310779+07	-.4874360+07	.7816511+07	.0000000	-.7310779+07	.5056305+07	.1722997+08

SEGMENT SYMMETRY CHECK

.3091516+08	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1002040+09	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.2111123+07	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1722997+08	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.3091516+08	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1002040+09	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.2111123+07	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1722997+08

RZERO(I) = 7.100000+01 RZERO(J) = 7.100000+01

INPUT DATA FOR REGION COUPLING

NUMBER OF REGION JOINTS 5   NUMBER OF KINEMATIC LINKS 0

REGION	JOINT(I)	JOINT(J)
1	1	2
2	2	3
3	3	4
4	4	5

BOUNDARY CONDITIONS

JOINT	DELTA T	DELYA Z	DELTA R	THETA	ANGLE ALPHA
1	0	1	0	1	.0000000
2	1	1	1	1	.0000000
3	1	0	1	1	.0000000
4	1	1	1	1	.0000000
5	0	1	0	1	.0000000

THE REDUCED STIFFNESS MATRIX

ROW	COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8
1	.1002040+09	-.7310779+07	.0000000	-.1002040+09	.9287349+06	.7310779+07	.0000000	.0000000
2	-.7310779+07	.1722997+08	.0000000	.7310779+07	.4874360+07	.7816511+07	.0000000	.0000000
3	.0000000	.0000000	.6183032+08	.0000000	.0000000	.0000000	-.3091516+08	.0000000
4	-.1002040+09	.7310779+07	.0000000	.2004081+09	.0000000	-.1462156+08	.0000000	.9287349+06
5	.9287349+06	.4874360+07	.0000000	.0000000	.4222246+07	.0000000	.0000000	-.1893110+07
6	.7310779+07	.7816511+07	.0000000	-.1462156+08	.0000000	.3445993+08	.0000000	.4874360+07
7	.0000000	.0000000	-.3091516+08	.0000000	.0000000	.0000000	.6183032+08	.0000000
8	.0000000	.0000000	.0000000	.9287349+06	-.1893110+07	.4874360+07	.0000000	.4222246+07
9	.0000000	.0000000	.0000000	.7310779+07	-.4874360+07	.7816511+07	.0000000	.0000000
10	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	-.3091516+08	.0000000
11	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	-.9287349+06
12	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	-.1893110+07
13	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	-.4874360+07
14	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
15	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000

ROW	COLUMN 9	COLUMN 10	COLUMN 11	COLUMN 12	COLUMN 13	COLUMN 14	COLUMN 15
1	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
2	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
3	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
4	.7310779+07	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
5	-.4874360+07	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
6	.7816511+07	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
7	.0000000	-.3091516+08	.0000000	.0000000	.0000000	.0000000	.0000000
8	.0000000	.0000000	-.9287349+06	-.1893110+07	-.4874360+07	.0000000	.0000000
9	.3445993+08	.0000000	.7310779+07	.4874360+07	.7816511+07	.0000000	.0000000
10	.0000000	.6183032+08	.0000000	.0000000	.0000000	.0000000	.0000000
11	.7310779+07	.0000000	.2004081+09	.0000000	-.1462156+08	-.1002040+09	.7310779+07
12	.4874360+07	.0000000	.0000000	.4222246+07	.0000000	-.9287349+06	-.4874360+07
13	.7816511+07	.0000000	-.1462156+08	.0000000	.3445993+08	.7310779+07	.7816511+07
14	.0000000	.0000000	-.1002040+09	-.9287349+06	.7310779+07	.1002040+09	-.7310779+07
15	.0000000	.0000000	.7310779+07	-.4874360+07	.7816511+07	-.7310779+07	.1722997+08

REGION NUMBER 1

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

HARMONIC (N) = 9

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.4082373+08	-.2819903+07	.7582015+06	.2857693+06	-.2469574+08	-.1640772+08	.1036468+07	.1759771+07
FORCZ1	-.2819903+07	.1011059+09	.8454511+06	-.7345008+07	.1640772+08	-.9496028+08	.6623936+06	.6933264+07
FORCR1	.7582015+06	.8454511+06	.2136387+07	-.5076704+07	.1036468+07	-.6623936+06	-.1898063+07	-.4879049+07
MOME 1	.2857693+06	-.7345008+07	-.5076704+07	.1725646+08	-.1759771+07	.6933264+07	.4879049+07	.7820319+07
FORCT2	-.2469574+08	.1640772+08	.1036468+07	-.1759771+07	.4082373+08	.2819903+07	.7582015+06	-.2857693+06
FORCZ2	-.1640772+08	-.9496028+08	-.6623936+06	.6933264+07	.2819903+07	.1011059+09	-.8454511+06	-.7345008+07
FORCR2	.1036468+07	.6623936+06	-.1898063+07	.4879049+07	.7582015+06	-.8454511+06	.2136387+07	.5076704+07
MOME 2	.1759771+07	.6933264+07	-.4879049+07	.7820319+07	-.2857693+06	-.7345008+07	.5076704+07	.1725646+08

SEGMENT SYMMETRY CHECK

.4082373+08	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1011059+09	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.2136387+07	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1725646+08	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.4082373+08	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1011059+09	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.2136387+07	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1725646+08

RZERO(I) = 7.100000+01 RZERO(J) = 7.100000+01

REGION NUMBER 2

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

HARMONIC (N) = 9

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.4082373+08	-.2819903+07	.7582015+06	.2857693+06	-.2469574+08	-.1640772+08	.1036468+07	.1759771+07
FORCZ1	-.2819903+07	.1011059+09	.8454511+06	-.7345008+07	.1640772+08	-.9496028+08	.6623936+06	.6933264+07
FORCR1	.7582015+06	.8454511+06	.2136387+07	-.5076704+07	-.1036468+07	-.6623936+06	-.1898063+07	-.4879049+07
MOME 1	.2857693+06	-.7345008+07	-.5076704+07	.1725646+08	-.1759771+07	.6933264+07	.4879049+07	.7820319+07
FORCT2	-.2469574+08	.1640772+08	.1036468+07	-.1759771+07	.4082373+08	.2819903+07	.7582015+06	-.2857693+06
FORCZ2	-.1640772+08	-.9496028+08	-.6623936+06	.6933264+07	.2819903+07	.1011059+09	-.8454511+06	-.7345008+07
FORCR2	.1036468+07	.6623936+06	-.1898063+07	.4879049+07	.7582015+06	-.8454511+06	.2136387+07	.5076704+07
MOME 2	.1759771+07	.6933264+07	-.4879049+07	.7820319+07	-.2857693+06	-.7345008+07	.5076704+07	.1725646+08

SEGMENT SYMMETRY CHECK

.4082373+08	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1011059+09	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.2136387+07	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1725646+08	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.4082373+08	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1011059+09	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.2136387+07	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1725646+08

RZERO(I) = 7.100000+01 RZERO(J) = 7.100000+01

REGION NUMBER 3

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

HARMONIC (N) = 9

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.4082373+08	-.2819903+07	.7582015+06	.2857693+06	-.2469574+08	-.1640772+08	.1036468+07	.1759771+07
FORCZ1	-.2819903+07	.1011059+09	.8454511+06	-.7345008+07	.1640772+08	-.9496028+08	.6623936+06	.6933264+07
FORCR1	.7582015+06	.8454511+06	.2136387+07	-.5076704+07	.1036468+07	-.6623936+06	-.1898063+07	-.4879049+07
MOME 1	.2857693+06	-.7345008+07	-.5076704+07	.1725646+08	-.1759771+07	.6933264+07	.4879049+07	.7820319+07
FORCT2	-.2469574+08	.1640772+08	.1036468+07	-.1759771+07	.4082373+08	.2819903+07	.7582015+06	-.2857693+06
FORCZ2	-.1640772+08	-.9496028+08	-.6623936+06	.6933264+07	.2819903+07	.1011059+09	-.8454511+06	-.7345008+07
FORCR2	.1036468+07	.6623936+06	-.1898063+07	.4879049+07	.7582015+06	-.8454511+06	.2136387+07	.5076704+07
MOME 2	.1759771+07	.6933264+07	-.4879049+07	.7820319+07	-.2857693+06	-.7345008+07	.5076704+07	.1725646+08

SEGMENT SYMMETRY CHECK

.4082373+08	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1011059+09	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.2136387+07	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1725646+08	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.4082373+08	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1011059+09	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.2136387+07	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1725646+08

RZERO(I) = 7.100000+01 RZERO(J) = 7.100000+01

REGION NUMBER 4

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

HARMONIC (N) = 9

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.4082373+08	-.2819903+07	.7582015+06	.2857693+06	-.2469574+08	-.1640772+08	.1036468+07	.1759771+07
FORCZ1	-.2819903+07	.1011059+09	.8454511+06	-.7345008+07	.1640772+08	-.9496028+08	.6623936+06	.6933264+07
FORCR1	.7582015+06	.8454511+06	.2136387+07	-.5076704+07	.1036468+07	-.6623936+06	-.1898063+07	-.4879049+07
MOME 1	.2857693+06	-.7345008+07	-.5076704+07	.1725646+08	-.1759771+07	.6933264+07	.4879049+07	.7820319+07
FORCT2	-.2469574+08	.1640772+08	.1036468+07	-.1759771+07	.4082373+08	.2819903+07	.7582015+06	-.2857693+06
FORCZ2	-.1640772+08	-.9496028+08	-.6623936+06	.6933264+07	.2819903+07	.1011059+09	-.8454511+06	-.7345008+07
FORCR2	.1036468+07	.6623936+06	-.1898063+07	.4879049+07	.7582015+06	-.8454511+06	.2136387+07	.5076704+07
MOME 2	.1759771+07	.6933264+07	-.4879049+07	.7820319+07	-.2857693+06	-.7345008+07	.5076704+07	.1725646+08

SEGMENT SYMMETRY CHECK

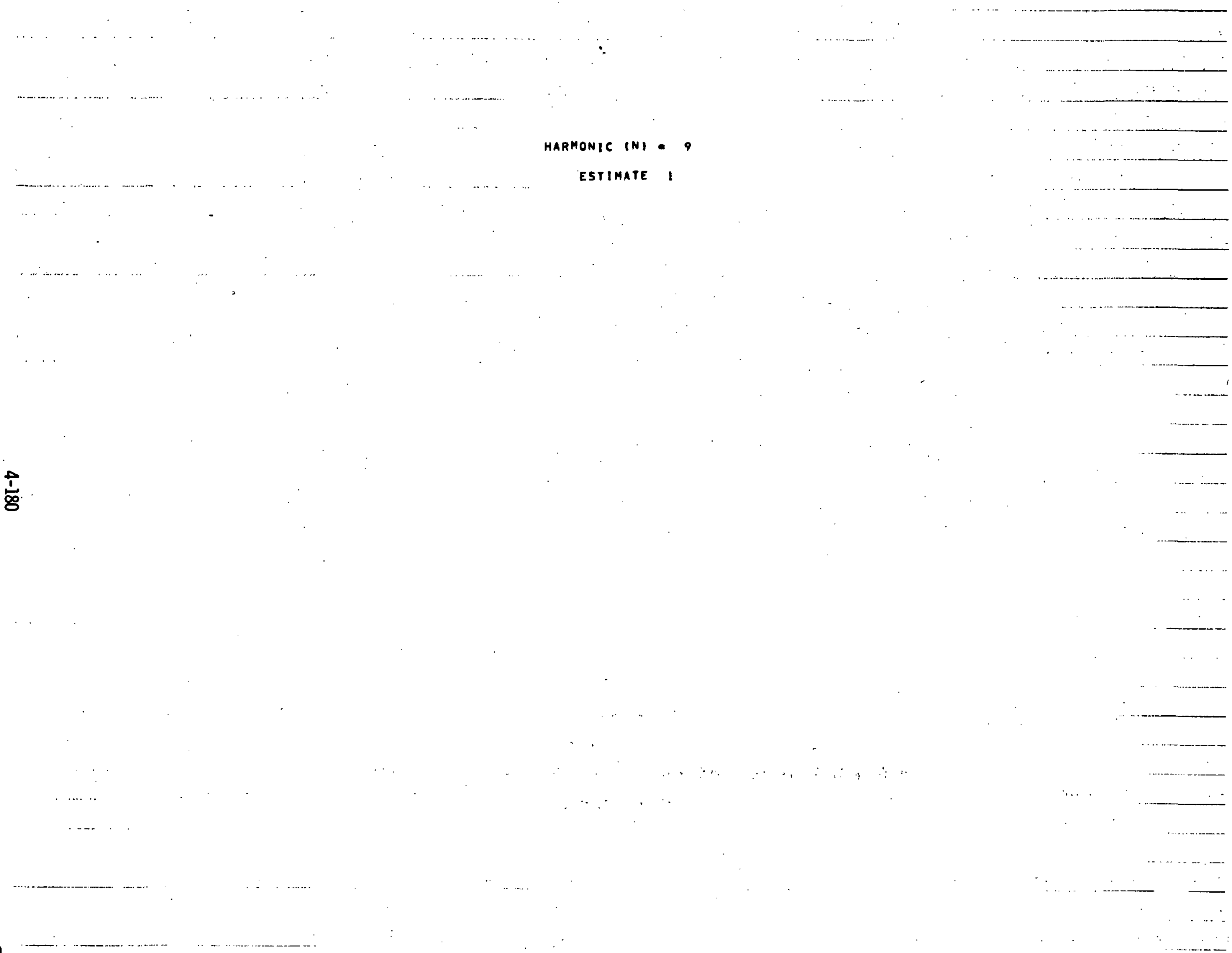
.4082373+08	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1011059+09	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.2136387+07	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1725646+08	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.4082373+08	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1011059+09	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.2136387+07	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1725646+08

RZERO(I) = 7.100000+01 RZERO(J) = 7.100000+01

THE REDUCED STIFFNESS MATRIX

ROW	COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8
1	.1011059+09	-.7345008+07	.1640772+08	-.9496028+08	.6623936+06	.6933264+07	.0000000	.0000000
2	-.7345008+07	.1725646+08	-.1759771+07	.6933264+07	.4879049+07	.7820319+07	.0000000	.0000000
3	.1640772+08	-.1759771+07	.8164746+08	.0000000	.1516403+07	.0000000	-.2469574+08	.1036468+07
4	-.9496028+08	.6933264+07	.0000000	.2022118+09	.0000000	-.1469002+08	.1640772+08	.6623936+06
5	.6623936+06	.4879049+07	.1516403+07	.0000000	.4272774+07	.0000000	.1036468+07	-.1898063+07
6	.6933264+07	.7820319+07	.0000000	-.1469002+08	.0000000	.3451293+08	-.1759771+07	.4879049+07
7	.0000000	.0000000	-.2469574+08	.1640772+08	.1036468+07	-.1759771+07	.8164746+08	.1516403+07
8	.0000000	.0000000	.1036468+07	.6623936+06	-.1898063+07	.4879049+07	.1516403+07	.4272774+07
9	.0000000	.0000000	.1759771+07	.6933264+07	-.4879049+07	.7820319+07	.0000000	.0000000
10	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	-.2469574+08	.1036468+07
11	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	-.1640772+08	-.6623936+06
12	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.1036468+07	-.1898063+07
13	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.1759771+07	-.4879049+07
14	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
15	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000

ROW	COLUMN 9	COLUMN 10	COLUMN 11	COLUMN 12	COLUMN 13	COLUMN 14	COLUMN 15
1	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
2	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
3	.1759771+07	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
4	.6933264+07	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
5	-.4879049+07	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
6	.7820319+07	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
7	.0000000	-.2469574+08	-.1640772+08	.1036468+07	.1759771+07	.0000000	.0000000
8	.0000000	.1036468+07	-.6623936+06	-.1898063+07	-.4879049+07	.0000000	.0000000
9	.3451293+08	-.1759771+07	.6933264+07	.4879049+07	.7820319+07	.0000000	.0000000
10	-.1759771+07	.8164746+08	.0000000	.1516403+07	.0000000	-.1640772+08	.1759771+07
11	.6933264+07	.0000000	.2022118+09	.0000000	-.1469002+08	-.9496028+08	.6933264+07
12	.4879049+07	.1516403+07	.0000000	.4272774+07	.0000000	-.6623936+06	-.4879049+07
13	.7820319+07	.0000000	-.1469002+08	.0000000	.3451293+08	.6933264+07	.7820319+07
14	.0000000	-.1640772+08	-.9496028+08	-.6623936+06	.6933264+07	.1011059+09	-.7345008+07
15	.0000000	.1759771+07	.6933264+07	-.4879049+07	.7820319+07	-.7345008+07	.1725646+08


HARMONIC (N) = 9
ESTIMATE 1

REGION NUMBER 1

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

HARMONIC (N) = 9

ESTIMATE 1

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FØRCT1	.4082121+08	-.2822093+07	.7591715+06	.2390913+06	-.2469821+08	-.1640554+08	.1034846+07	.1799951+07
FØRCZ1	-.2822093+07	.1011040+09	.8452122+06	-.7383312+07	.1640554+08	-.9495836+08	.6620606+06	.6971333+07
FØRCR1	.7591715+06	.8452122+06	.1548558+07	-.4832761+07	.1034846+07	-.6620606+06	-.1310319+07	-.4623762+07
MOME 1	.2390913+06	-.7383312+07	-.4832761+07	.1556845+08	-.1799951+07	.6971333+07	.4623762+07	.8257896+07
FØRCT2	-.2469821+08	.1640554+08	.1034846+07	-.1799951+07	.4082121+08	.2822093+07	.7591715+06	-.2390913+06
FØRCZ2	-.1640554+08	-.9495836+08	-.6620606+06	.6971333+07	.2822093+07	.1011040+09	-.8452122+06	-.7383312+07
FØRCR2	.1034846+07	.6620606+06	-.1310319+07	.4623762+07	.7591715+06	-.8452122+06	.1548558+07	.4832761+07
MOME 2	.1799951+07	.6971333+07	-.4623762+07	.8257896+07	-.2390913+06	-.7383312+07	.4832761+07	.1556845+08

SEGMENT SYMMETRY CHECK

.4082121+08	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1011040+09	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1548558+07	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1556845+08	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.4082121+08	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1011040+09	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1548558+07	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1556845+08

RZERO(I) = 7.100000+01 RZERO(J) = 7.100000+01

REGION NUMBER 2

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

HARMONIC (N) = 9

ESTIMATE 1

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.4082121+08	-.2822093+07	.7591715+06	.2390913+06	-.2469821+08	-.1640554+08	.1034846+07	.1799951+07
FORCZ1	-.2822093+07	.1011040+09	.8452122+06	-.7383312+07	.1640554+08	-.9495836+08	.6620606+06	.6971333+07
FORCR1	.7591715+06	.8452122+06	.1548558+07	-.4832761+07	.1034846+07	-.6620606+06	-.1310319+07	-.4623762+07
MOME 1	.2390913+06	-.7383312+07	-.4832761+07	.1556845+08	-.1799951+07	.6971333+07	.4623762+07	.8257896+07
FORCT2	-.2469821+08	.1640554+08	.1034846+07	-.1799951+07	.4082121+08	.2822093+07	.7591715+06	-.2390913+06
FORCZ2	-.1640554+08	-.9495836+08	-.6620606+06	.6971333+07	.2822093+07	.1011040+09	-.8452122+06	-.7383312+07
FORCR2	.1034846+07	.6620606+06	-.1310319+07	.4623762+07	.7591715+06	-.8452122+06	.1548558+07	.4832761+07
MOME 2	.1799951+07	.6971333+07	-.4623762+07	.8257896+07	-.2390913+06	-.7383312+07	.4832761+07	.1556845+08

SEGMENT SYMMETRY CHECK

.4082121+08	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1011040+09	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1548558+07	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1556845+08	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.4082121+08	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1011040+09	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1548558+07	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1556845+08

RZERO(I) = 7.100000+01 RZERO(J) = 7.100000+01

REGION NUMBER 3

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

HARMONIC (N) = 9

ESTIMATE 1

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.4082121+08	-.2822093+07	.7591715+06	.2390913+06	-.2469821+08	-.1640554+08	.1034846+07	.1799951+07
FORCZ1	-.2822093+07	.1011040+09	.8452122+06	-.7383312+07	.1640554+08	-.9495836+08	.6620606+06	.6971333+07
FORCR1	.7591715+06	.8452122+06	.1548558+07	-.4832761+07	.1034846+07	-.6620606+06	-.1310319+07	-.4623762+07
MOME 1	.2390913+06	-.7383312+07	-.4832761+07	.1556845+08	-.1799951+07	.6971333+07	.4623762+07	.8257896+07
FORCT2	-.2469821+08	.1640554+08	.1034846+07	-.1799951+07	.4082121+08	.2822093+07	.7591715+06	-.2390913+06
FORCZ2	-.1640554+08	-.9495836+08	-.6620606+06	.6971333+07	.2822093+07	.1011040+09	-.8452122+06	-.7383312+07
FORCR2	.1034846+07	.6620606+06	-.1310319+07	.4623762+07	.7591715+06	-.8452122+06	.1548558+07	.4832761+07
MOME 2	.1799951+07	.6971333+07	-.4623762+07	.8257896+07	-.2390913+06	-.7383312+07	.4832761+07	.1556845+08

SEGMENT SYMMETRY CHECK

.4082121+08	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1011040+09	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1548558+07	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1556845+08	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.4082121+08	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1011040+09	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1548558+07	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1556845+08

RZERO(I) = 7.100000+01 RZERO(J) = 7.100000+01

REGION NUMBER 4

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

HARMONIC (N) = 9

ESTIMATE 1

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.4082121+08	-.2822093+07	.7591715+06	.2390913+06	-.2469821+08	-.1640554+08	.1034846+07	.1799951+07
FORCZ1	-.2822093+07	.1011040+09	.8452122+06	-.7383312+07	.1640554+08	-.9495836+08	.6620606+06	.6971333+07
FORCR1	.7591715+06	.8452122+06	.1548558+07	-.4832761+07	.1034846+07	-.6620606+06	-.1310319+07	-.4623762+07
MOME 1	.2390913+06	-.7383312+07	-.4832761+07	.1556845+08	-.1799951+07	.6971333+07	.4623762+07	.8257896+07
FORCT2	-.2469821+08	.1640554+08	.1034846+07	-.1799951+07	.4082121+08	.2822093+07	.7591715+06	-.2390913+06
FORCZ2	-.1640554+08	-.9495836+08	-.6620606+06	.6971333+07	.2822093+07	.1011040+09	-.8452122+06	-.7383312+07
FORCR2	.1034846+07	.6620606+06	-.1310319+07	.4623762+07	.7591715+06	-.8452122+06	.1548558+07	.4832761+07
MOME 2	.1799951+07	.6971333+07	-.4623762+07	.8257896+07	-.2390913+06	-.7383312+07	.4832761+07	.1556845+08

SEGMENT SYMMETRY CHECK

.4082121+08	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1011040+09	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1548558+07	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1556845+08	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.4082121+08	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1011040+09	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1548558+07	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1556845+08

RZERO(I) = 7.100000+01 RZERO(J) = 7.100000+01

THE REDUCED STIFFNESS MATRIX

ROW	COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8
1	.1011040+09	-.7383311+07	.1640554+08	-.9495836+08	.6620606+06	.6971333+07	.0000000	.0000000
2	-.7383311+07	.1556845+08	-.1799951+07	.6971333+07	.4623762+07	.8257896+07	.0000000	.0000000
3	.1640554+08	-.1799951+07	.8164243+08	.0000000	.1518343+07	.0000000	-.2469821+08	.1034846+07
4	-.9495836+08	.6971333+07	.0000000	.2022080+09	.0000000	-.1476662+08	.1640554+08	.6620606+06
5	.6620606+06	.4623762+07	.1518343+07	.0000000	.3097115+07	.0000000	.1034846+07	-.1310319+07
6	.6971333+07	.8257896+07	.0000000	-.1476662+08	.0000000	.3113690+08	-.1799951+07	.4623762+07
7	.0000000	.0000000	-.2469821+08	.1640554+08	.1034846+07	-.1799951+07	.8164243+08	.1518343+07
8	.0000000	.0000000	.1034846+07	.6620606+06	-.1310319+07	.4623762+07	.1518343+07	.3097115+07
9	.0000000	.0000000	.1799951+07	.6971333+07	-.4623762+07	.8257896+07	.0000000	.0000000
10	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	-.2469821+08	.1034846+07
11	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	-.1640554+08	-.6620606+06
12	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.1034846+07	-.1310319+07
13	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.1799951+07	-.4623762+07
14	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
15	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000

ROW	COLUMN 9	COLUMN 10	COLUMN 11	COLUMN 12	COLUMN 13	COLUMN 14	COLUMN 15
1	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
2	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
3	.1799951+07	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
4	.6971333+07	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
5	-.4623762+07	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
6	.8257896+07	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
7	.0000000	-.2469821+08	-.1640554+08	.1034846+07	.1799951+07	.0000000	.0000000
8	.0000000	.1034846+07	-.6620606+06	-.1310319+07	-.4623762+07	.0000000	.0000000
9	.3113690+08	-.1799951+07	.6971333+07	.4623762+07	.8257896+07	.0000000	.0000000
10	-.1799951+07	.8164243+08	.0000000	.1518343+07	.0000000	-.1640554+08	.1799951+07
11	.6971333+07	.0000000	.2022080+09	.0000000	-.1476662+08	-.9495836+08	.6971333+07
12	.4623762+07	.1518343+07	.0000000	.3097115+07	.0000000	-.6620606+06	-.4623762+07
13	.8257896+07	.0000000	-.1476662+08	.0000000	.3113690+08	.6971333+07	.8257896+07
14	.0000000	-.1640554+08	-.9495836+08	-.6620606+06	.6971333+07	.1011040+09	-.7383311+07
15	.0000000	.1799951+07	.6971333+07	-.4623762+07	.8257896+07	-.7383311+07	.1556845+08

DIVE LOAD PRESTRESS STIFFNESS MATRIX

1	1.011040+08							
2	-7.383311+06	1.556845+07						
3	1.640554+07	-1.799951+06	8.164243+07					
4	-9.495836+07	6.971333+06	0.000000	2.022080+08				
5	6.620606+05	4.623762+06	1.518343+06	0.000000	3.097115+06			
6	6.971333+06	8.257896+06	0.000000	-1.476662+07	0.000000	3.113690+07		
7	0.000000	0.000000	-2.469821+07	1.640554+07	1.034846+06	-1.799951+06	8.164243+07	
8	0.000000	0.000000	1.034846+06	6.620606+05	-1.310319+06	4.623762+06	1.518343+06	3.097115+06
9	0.000000	0.000000	1.799951+06	6.971333+06	-4.623762+06	8.257896+06	0.000000	0.000000
	3.113690+07							
10	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	-2.469821+07	1.034846+06
	-1.799951+06	8.164243+07						
11	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	-1.640554+07	-6.620606+05
	6.971333+06	0.000000	2.022080+08					
12	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	1.034846+06	-1.310319+06
	4.623762+06	1.518343+06	0.000000	3.097115+06				
13	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	1.799951+06	-4.623762+06
	8.257896+06	0.000000	-1.476662+07	0.000000	3.113690+07			
14	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
	0.000000	-1.640554+07	-9.495836+07	-6.620606+05	6.971333+06	1.011040+08		
15	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
	0.000000	1.799951+06	6.971333+06	-4.623762+06	8.257896+06	-7.383311+06	1.556845+07	

```
DEAD LOAD PRESTRESS OR BASE STIFFNESS MATRIX
  1   1.011059+08
  2  -7.345008+06   1.725646+07
  3   1.640772+07  -1.759771+06   8.164746+07
  4  -9.496028+07   6.933264+06   0.000000      2.022118+08
  5   6.623936+05   4.879049+06   1.516403+06   0.000000      4.272774+06
  6   6.933264+06   7.820319+06   0.000000     -1.469002+07   0.000000      3.451293+07
  7   0.000000      0.000000     -2.469574+07   1.640772+07   1.036468+06  -1.759771+06   8.164746+07
  8   0.000000      0.000000      1.036468+06   6.623936+05  -1.898063+06   4.879049+06   1.516403+06   4.272774+06

  9   0.000000      0.000000      1.759771+06   6.933264+06  -4.879049+06   7.820319+06   0.000000      0.000000
      3.451293+07
 10   0.000000      0.000000      0.000000      0.000000      0.000000      0.000000     -2.469574+07   1.036468+06
     -1.759771+06   8.164746+07
 11   0.000000      0.000000      0.000000      0.000000      0.000000      0.000000     -1.640772+07  -6.623936+05
      6.933264+06   0.000000      2.022118+08
 12   0.000000      0.000000      0.000000      0.000000      0.000000      0.000000      1.036468+06  -1.898063+06
      4.879049+06   1.516403+06   0.000000      4.272774+06
 13   0.000000      0.000000      0.000000      0.000000      0.000000      0.000000      1.759771+06  -4.879049+06
      7.820319+06   0.000000     -1.469002+07   0.000000      3.451293+07
 14   0.000000      0.000000      0.000000      0.000000      0.000000      0.000000      0.000000      0.000000
      0.000000     -1.640772+07  -9.496028+07  -6.623936+05   6.933264+06   1.011059+08
 15   0.000000      0.000000      0.000000      0.000000      0.000000      0.000000      0.000000      0.000000
      0.000000      1.759771+06   6.933264+06  -4.879049+06   7.820319+06  -7.345008+06   1.725646+07

EIGENVALUES
   1.004555+00   1.135241+00   2.031256+00   3.942994+00   6.391449+00   1.060922+01   1.646587+01   2.005135+01
   6.432548+03   2.609902+04   9.117412+04   1.840767+05   2.814917+06   1.245206+07   1.430613+08

EIGENVECTOR   1
  -6.307960-07  -2.022076-04  -6.567404-05  -4.460405-07   9.102566-04  -1.429823-04  -9.287713-05   1.287297-03
  -1.953678-11  -6.567405-05   4.460435-07   9.102567-04   1.429823-04   6.308027-07   2.022076-04

EIGENVECTOR   2
   2.794966-05   1.917153-04   1.412793-05   1.298207-05  -6.085999-04  -7.805391-07   9.686949-12  -1.476798-10
  -1.892152-04  -1.412792-05   1.298207-05   6.085997-04  -7.805777-07   2.794967-05   1.917153-04

   THE CURRENT LOAD MULTIPLICATION FACTOR =   1.004555+00
```

REGION NUMBER 1

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 31 SHUTTLE CYLINDER

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
1.0000000+00	0.0000000	6.3079599-07	0.0000000	-2.02208-04	0.0000000	-2.7949664-05	0.0000000	1.91715-04
1.5500000+00	-8.0140617-06	6.2709203-07	-1.1107153-04	-2.01433-04	2.4049799-06	-2.7691998-05	1.0477418-04	1.88370-04
2.0500000+00	-1.5249522-05	6.1805330-07	-2.1133204-04	-1.99399-04	4.5350166-06	-2.7086768-05	1.9721006-04	1.80641-04
2.5500000+00	-2.2391421-05	6.0379725-07	-3.1026197-04	-1.96113-04	6.5569648-06	-2.6142827-05	2.8469853-04	1.68616-04
3.0500000+00	-2.9395952-05	5.8460346-07	-4.0724043-04	-1.91598-04	8.4211038-06	-2.4882046-05	3.6515239-04	1.52552-04
3.5500000+00	-3.6220186-05	5.6084601-07	-5.0165960-04	-1.85882-04	1.0081876-05	-2.3333427-05	4.3663399-04	1.32790-04
4.0500000+00	-4.2822347-05	5.3298785-07	-5.9292874-04	-1.79005-04	1.1499029-05	-2.1532561-05	4.9739574-04	1.09749-04
4.5500000+00	-4.9162070-05	5.0157365-07	-6.8047809-04	-1.71011-04	1.2638644-05	-1.9520962-05	5.4591710-04	8.39155-05
5.0500000+00	-5.5200666-05	4.6722153-07	-7.6376255-04	-1.61954-04	1.3474033-05	-1.7345292-05	5.8093703-04	5.58388-05
5.5500000+00	-6.0901356-05	4.3061374-07	-8.4226535-04	-1.51895-04	1.3986486-05	-1.5056493-05	6.0148145-04	2.61165-05
6.0000000+00	-6.5714399-05	3.9634561-07	-9.0842781-04	-1.42038-04	1.4163009-05	-1.2944644-05	6.0703833-04	-1.51604-06

REGION NUMBER 2

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 31 SHUTTLE CYLINDER

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
1.0000000+00	-6.5674044-05	4.4604051-07	-9.1025656-04	-1.42982-04	1.4127931-05	-1.2982068-05	6.0859988-04	-7.80539-07
1.5500000+00	-7.1095879-05	4.0431704-07	-9.8539816-04	-1.30088-04	1.3952587-05	-1.0433925-05	5.9890043-04	-3.43057-05
2.0500000+00	-7.5565838-05	3.6313124-07	-1.0473301-03	-1.17511-04	1.3438601-05	-8.2361739-06	5.7438955-04	-6.34737-05
2.5500000+00	-7.9570214-05	3.1919985-07	-1.1027869-03	-1.04201-04	1.2595661-05	-6.2059443-06	5.3574158-04	-9.07541-05
3.0500000+00	-8.3084430-05	2.7291089-07	-1.1514225-03	-9.02405-05	1.1440738-05	-4.3918925-06	4.8404615-04	-1.15572-04
3.5500000+00	-8.6086942-05	2.2469192-07	-1.1929336-03	-7.57176-05	9.9984182-06	-2.8378084-06	4.2066699-04	-1.37408-04
4.0500000+00	-8.8559384-05	1.7500552-07	-1.2270615-03	-6.07230-05	8.3000650-06	-1.5817906-06	3.4721179-04	-1.55806-04
4.5500000+00	-9.0486683-05	1.2434424-07	-1.2535937-03	-4.53508-05	6.3828453-06	-6.5552189-07	2.6549720-04	-1.70388-04
5.0500000+00	-9.1857150-05	7.3225095-08	-1.2723655-03	-2.96976-05	4.2886292-06	-8.3662639-08	1.7750981-04	-1.80855-04
5.5500000+00	-9.2662555-05	2.2183776-08	-1.2832608-03	-1.38618-05	2.0627926-06	1.1662688-07	8.5363786-05	-1.86995-04
6.0000000+00	-9.2900324-05	-2.3233892-08	-1.2862764-03	4.64339-07	-1.3671070-08	-2.8673083-08	6.9151342-07	-1.88722-04

REGION NUMBER 3

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 31 SHUTTLE CYLINDER

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
1.0000000+00	-9.2877128-05	0.0000000	-1.2872973-03	-1.95368-11	9.6869493-12	0.0000000	1.4767978-10	-1.89215-04
1.5500000+00	-9.2530699-05	-5.5302406-08	-1.2824920-03	1.74607-05	-2.5247719-06	1.2818391-07	-1.0356424-04	-1.86478-04
2.0500000+00	-9.1616714-05	-1.0450962-07	-1.2698165-03	3.32136-05	-4.7250346-06	-1.5541106-07	-1.9519746-04	-1.79324-04
2.5500000+00	-9.0137859-05	-1.5238235-07	-1.2493143-03	4.87513-05	-6.7858411-06	-8.0852134-07	-2.8217092-04	-1.67870-04
3.0500000+00	-8.8103179-05	-1.9865139-07	-1.2211170-03	6.39783-05	-8.6623642-06	-1.8119652-06	-3.6238990-04	-1.52352-04
3.5500000+00	-8.5525137-05	-2.4308619-07	-1.1854034-03	7.88011-05	-1.0313580-05	-3.1391407-06	-4.3389839-04	-1.33089-04
4.0500000+00	-8.2419538-05	-2.8549547-07	-1.1423983-03	9.31293-05	-1.1703447-05	-4.7565389-06	-4.9492087-04	-1.10481-04
4.5500000+00	-7.8805426-05	-3.2572733-07	-1.0923711-03	1.06875-04	-1.2801981-05	-6.6243840-06	-5.4390053-04	-8.50019-05
5.0500000+00	-7.4704962-05	-3.6366872-07	-1.0356339-03	1.19956-04	-1.3586203-05	-8.6973872-06	-5.7953320-04	-5.71872-05
5.5500000+00	-7.0143287-05	-3.9924429-07	-9.7253952-04	1.32291-04	-1.4040941-05	-1.0925603-05	-6.0079641-04	-2.76260-05
6.0000000+00	-6.5666500-05	-4.2920638-07	-9.1064171-04	1.42695-04	-1.4162748-05	-1.3019411-05	-6.0704800-04	-4.75794-08

REGION NUMBER 4

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 31 SHUTTLE CYLINDER

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
1.0000000+00	-6.5674049-05	-4.4604352-07	-9.1025669-04	1.42982-04	-1.4127916-05	-1.2982068-05	-6.0859971-04	-7.80578-07
1.5500000+00	-5.9762289-05	-4.8252923-07	-8.2831941-04	1.54781-04	-1.3886016-05	-1.5557038-05	-5.9974317-04	3.28233-05
2.0500000+00	-5.3999760-05	-5.1093274-07	-7.4846156-04	1.64482-04	-1.3315399-05	-1.7823904-05	-5.7593221-04	6.21736-05
2.5500000+00	-4.7903966-05	-5.3470342-07	-6.6401028-04	1.73146-04	-1.2423069-05	-1.9965147-05	-5.3786787-04	8.97356-05
3.0500000+00	-4.1512278-05	-5.5384861-07	-5.7549763-04	1.80720-04	-1.1229565-05	-2.1931042-05	-4.8659237-04	1.14925-04
3.5500000+00	-3.4863864-05	-5.6846981-07	-4.8347984-04	1.87159-04	-9.7632233-06	-2.3676349-05	-4.2342765-04	1.37209-04
4.0500000+00	-2.7999441-05	-5.7875911-07	-3.8853363-04	1.92428-04	-8.0593967-06	-2.5161161-05	-3.4994674-04	1.56117-04
4.5500000+00	-2.0961015-05	-5.8499423-07	-2.9125233-04	1.96495-04	-6.1595257-06	-2.6351647-05	-2.6794024-04	1.71251-04
5.0500000+00	-1.3791617-05	-5.8753231-07	-1.9224205-04	1.99341-04	-4.1100841-06	-2.7220688-05	-1.7937856-04	1.82291-04
5.5500000+00	-6.5350291-06	-5.8680248-07	-9.2117675-05	2.00950-04	-1.9614193-06	-2.7748379-05	-8.6320679-05	1.89004-04
6.0000000+00	3.3873441-08	-5.8375768-07	-1.5653674-06	2.01337-04	1.3459544-08	-2.7921107-05	-6.8213213-07	1.91225-04

REGION NUMBER 1

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

HARMONIC (N) = 10

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.4294955+08	-.3445787+07	.8246849+06	.3300370+06	-.2343001+08	-.1782556+08	.1129815+07	.1929293+07
FORCZ1	-.3445787+07	.1013995+09	.8305354+06	-.7357433+07	.1782556+08	-.9383066+08	.6051150+06	.6849929+07
FORCR1	.8246849+06	.8305354+06	.2142602+07	-.5081759+07	.1129815+07	-.6051150+06	-.1898946+07	-.4879876+07
MOME 1	.3300370+06	-.7357433+07	-.5081759+07	.1726297+08	-.1929293+07	.6849929+07	.4879876+07	.7820978+07
FORCT2	-.2343001+08	.1782556+08	.1129815+07	-.1929293+07	.4294955+08	.3445787+07	.8246849+06	-.3300370+06
FORCZ2	-.1782556+08	-.9383066+08	-.6051150+06	.6849929+07	.3445787+07	.1013995+09	-.8305354+06	-.7357433+07
FORCR2	.1129815+07	.6051150+06	-.1898946+07	.4879876+07	.8246849+06	-.8305354+06	.2142602+07	.5081759+07
MOME 2	.1929293+07	.6849929+07	-.4879876+07	.7820978+07	-.3300370+06	-.7357433+07	.5081759+07	.1726297+08

SEGMENT SYMMETRY CHECK

.4294955+08	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1013995+09	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.2142602+07	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1726297+08	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.4294955+08	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1013995+09	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.2142602+07	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1726297+08

RZERO(I) = 7.100000+01 RZERO(J) = 7.100000+01

REGION NUMBER 2

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

HARMONIC (N) = 10

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.4294955+08	-.3445787+07	.8246849+06	.3300370+06	-.2343001+08	-.1782556+08	.1129815+07	.1929293+07
FORCZ1	-.3445787+07	.1013995+09	.8305354+06	-.7357433+07	.1782556+08	-.9383066+08	.6051150+06	.6849929+07
FORCR1	.8246849+06	.8305354+06	.2142602+07	-.5081759+07	.1129815+07	-.6051150+06	-.1898946+07	-.4879876+07
MOME 1	.3300370+06	-.7357433+07	-.5081759+07	.1726297+08	-.1929293+07	.6849929+07	.4879876+07	.7820978+07
FORCT2	-.2343001+08	.1782556+08	.1129815+07	-.1929293+07	.4294955+08	.3445787+07	.8246849+06	-.3300370+06
FORCZ2	-.1782556+08	-.9383066+08	-.6051150+06	.6849929+07	.3445787+07	.1013995+09	-.8305354+06	-.7357433+07
FORCR2	.1129815+07	.6051150+06	-.1898946+07	.4879876+07	.8246849+06	-.8305354+06	.2142602+07	.5081759+07
MOME 2	.1929293+07	.6849929+07	-.4879876+07	.7820978+07	-.3300370+06	-.7357433+07	.5081759+07	.1726297+08

SEGMENT SYMMETRY CHECK

.4294955+08	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1013995+09	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.2142602+07	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1726297+08	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.4294955+08	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1013995+09	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.2142602+07	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1726297+08

RZERO(I) = 7.100000+01 RZERO(J) = 7.100000+01

REGION NUMBER 3

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

HARMONIC (N) = 10

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.4294955+08	-.3445787+07	.8246849+06	.3300370+06	-.2343001+08	-.1782556+08	.1129815+07	.1929293+07
FORCZ1	-.3445787+07	.1013995+09	.8305354+06	-.7357433+07	.1782556+08	-.9383066+08	.6051150+06	.6849929+07
FORCR1	.8246849+06	.8305354+06	.2142602+07	-.5081759+07	.1129815+07	-.6051150+06	-.1898946+07	-.4879876+07
MOME 1	.3300370+06	-.7357433+07	-.5081759+07	.1726297+08	-.1929293+07	.6849929+07	.4879876+07	.7820978+07
FORCT2	-.2343001+08	.1782556+08	.1129815+07	-.1929293+07	.4294955+08	.3445787+07	.8246849+06	-.3300370+06
FORCZ2	-.1782556+08	-.9383066+08	-.6051150+06	.6849929+07	.3445787+07	.1013995+09	-.8305354+06	-.7357433+07
FORCR2	.1129815+07	.6051150+06	-.1898946+07	.4879876+07	.8246849+06	-.8305354+06	.2142602+07	.5081759+07
MOME 2	.1929293+07	.6849929+07	-.4879876+07	.7820978+07	-.3300370+06	-.7357433+07	.5081759+07	.1726297+08

SEGMENT SYMMETRY CHECK

.4294955+08	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1013995+09	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.2142602+07	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1726297+08	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.4294955+08	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1013995+09	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.2142602+07	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1726297+08

RZERO(I) = 7.100000+01 RZERO(J) = 7.100000+01

REGION NUMBER 4

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

HARMONIC (N) = 10

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.4294955+08	-.3445787+07	.8246849+06	.3300370+06	-.2343001+08	-.1782556+08	.1129815+07	.1929293+07
FORCZ1	-.3445787+07	.1013995+09	.8305354+06	-.7357433+07	.1782556+08	-.9383066+08	.6051150+06	.6849929+07
FORCR1	.8246849+06	.8305354+06	.2142602+07	-.5081759+07	.1129815+07	-.6051150+06	-.1898946+07	-.4879876+07
MOME 1	.3300370+06	-.7357433+07	-.5081759+07	.1726297+08	-.1929293+07	.6849929+07	.4879876+07	.7820978+07
FORCT2	-.2343001+08	.1782556+08	.1129815+07	-.1929293+07	.4294955+08	.3445787+07	.8246849+06	-.3300370+06
FORCZ2	-.1782556+08	-.9383066+08	-.6051150+06	.6849929+07	.3445787+07	.1013995+09	-.8305354+06	-.7357433+07
FORCR2	.1129815+07	.6051150+06	-.1898946+07	.4879876+07	.8246849+06	-.8305354+06	.2142602+07	.5081759+07
MOME 2	.1929293+07	.6849929+07	-.4879876+07	.7820978+07	-.3300370+06	-.7357433+07	.5081759+07	.1726297+08

SEGMENT SYMMETRY CHECK

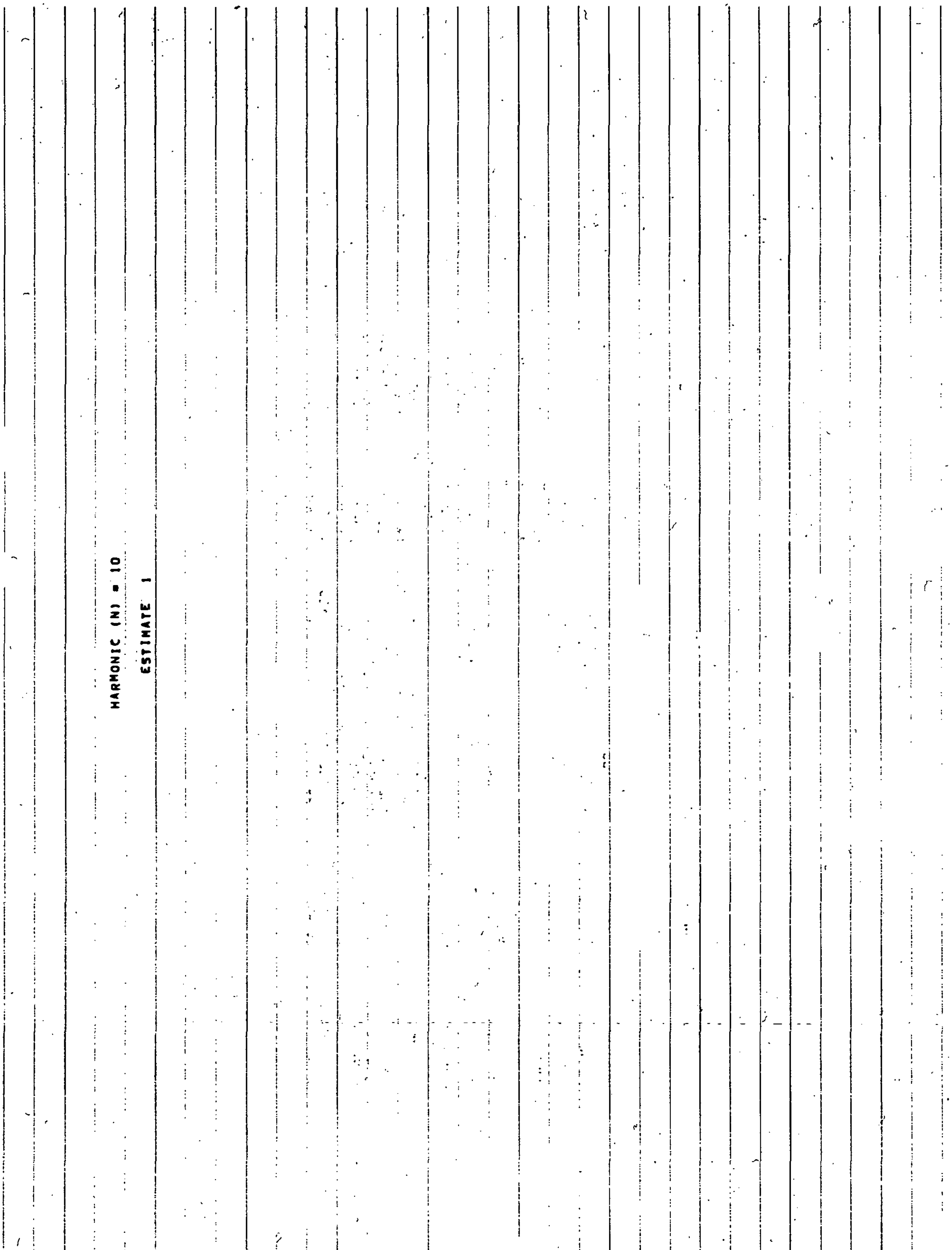
.4294955+08	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1013995+09	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.2142602+07	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1726297+08	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.4294955+08	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1013995+09	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.2142602+07	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1726297+08

RZERO(I) = 7.100000+01 RZERO(J) = 7.100000+01

THE REDUCED STIFFNESS MATRIX

ROW	COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8
1	.1013995+09	-.7357433+07	.1782556+08	-.9383065+08	.6051150+06	.6849929+07	.0000000	.0000000
2	-.7357433+07	.1726297+08	-.1929293+07	.6849929+07	.4879876+07	.7820978+07	.0000000	.0000000
3	.1782556+08	-.1929293+07	.8589910+08	.0000000	.1649370+07	.0000000	-.2343001+08	.1129815+07
4	-.9383065+08	.6849929+07	.0000000	.2027990+09	.0000000	-.1471487+08	.1782556+08	.6051150+06
5	.6051150+06	.4879876+07	.1649370+07	.0000000	.4285204+07	.0000000	.1129815+07	-.1898946+07
6	.6849929+07	.7820978+07	.0000000	-.1471487+08	.0000000	.3452594+08	-.1929293+07	.4879876+07
7	.0000000	.0000000	-.2343001+08	.1782556+08	.1129815+07	-.1929293+07	.8589910+08	.1649370+07
8	.0000000	.0000000	.1129815+07	.6051150+06	-.1898946+07	.4879876+07	.1649370+07	.4285204+07
9	.0000000	.0000000	.1929293+07	.6849929+07	-.4879876+07	.7820978+07	.0000000	.0000000
10	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	-.2343001+08	.1129815+07
11	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	-.1782556+08	-.6051150+06
12	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.1129815+07	-.1898946+07
13	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.1929293+07	-.4879876+07
14	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
15	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000

ROW	COLUMN 9	COLUMN 10	COLUMN 11	COLUMN 12	COLUMN 13	COLUMN 14	COLUMN 15
1	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
2	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
3	.1929293+07	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
4	.6849929+07	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
5	-.4879876+07	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
6	.7820978+07	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
7	.0000000	-.2343001+08	-.1782556+08	.1129815+07	.1929293+07	.0000000	.0000000
8	.0000000	.1129815+07	-.6051150+06	-.1898946+07	-.4879876+07	.0000000	.0000000
9	.3452594+08	-.1929293+07	.6849929+07	.4879876+07	.7820978+07	.0000000	.0000000
10	-.1929293+07	.8589910+08	.0000000	.1649370+07	.0000000	-.1782556+08	.1929293+07
11	.6849929+07	.0000000	.2027990+09	.0000000	-.1471487+08	-.9383065+08	.6849929+07
12	.4879876+07	.1649370+07	.0000000	.4285204+07	.0000000	-.6051150+06	-.4879876+07
13	.7820978+07	.0000000	-.1471487+08	.0000000	.3452594+08	.6849929+07	.7820978+07
14	.0000000	-.1782556+08	-.9383065+08	-.6051150+06	.6849929+07	.1013995+09	-.7357433+07
15	.0000000	.1929293+07	.6849929+07	-.4879876+07	.7820978+07	-.7357433+07	.1726297+08


HARMONIC (N) = 10
ESTIMATE 1

REGION NUMBER 1

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

HARMONIC (N) = 10

ESTIMATE 1

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.4294642+08	-.3448188+07	.8257788+06	.2779775+06	-.2343307+08	-.1782316+08	.1127968+07	.1973977+07
FORCZ1	-.3448188+07	.1013977+09	.8303028+06	-.7395172+07	.1782316+08	-.9382879+08	.6047634+06	.6887369+07
FORCR1	.8257788+06	.8303028+06	.1554795+07	-.4838068+07	.1127968+07	-.6047634+06	-.1311230+07	-.4624413+07
MOME 1	.2779775+06	-.7395172+07	.4838068+07	.1557558+08	-.1973977+07	.6887369+07	.4624413+07	.8257989+07
FORCT2	-.2343307+08	.1782316+08	.1127968+07	-.1973977+07	.4294642+08	.3448188+07	.8257788+06	-.2779775+06
FORCZ2	-.1782316+08	-.9382879+08	-.6047634+06	.6887369+07	.3448188+07	.1013977+09	-.8303028+06	-.7395172+07
FORCR2	.1127968+07	.6047634+06	-.1311230+07	.4624413+07	.8257788+06	-.8303028+06	.1554795+07	.4838068+07
MOME 2	.1973977+07	.6887369+07	-.4624413+07	.8257989+07	-.2779775+06	-.7395172+07	.4838068+07	.1557558+08

SEGMENT SYMMETRY CHECK

.4294642+08	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1013977+09	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1554795+07	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1557558+08	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.4294642+08	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1013977+09	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1554795+07	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1557558+08

RZERO(I) = 7.100000+01 RZERO(J) = 7.100000+01

REGION NUMBER 2

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

HARMONIC (N) = 10

ESTIMATE 1

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.4294642+08	-.3448188+07	.8257788+06	.2779775+06	-.2343307+08	-.1782316+08	.1127968+07	.1973977+07
FORCZ1	-.3448188+07	.1013977+09	.8303028+06	-.7395172+07	.1782316+08	-.9382879+08	.6047634+06	.6887369+07
FORCR1	.8257788+06	.8303028+06	.1554795+07	-.4838068+07	.1127968+07	-.6047634+06	-.1311230+07	-.4624413+07
MOME 1	.2779775+06	-.7395172+07	-.4838068+07	.1557558+08	-.1973977+07	.6887369+07	.4624413+07	.8257989+07
FORCT2	-.2343307+08	.1782316+08	.1127968+07	-.1973977+07	.4294642+08	.3448188+07	.8257788+06	-.2779775+06
FORCZ2	-.1782316+08	-.9382879+08	-.6047634+06	.6887369+07	.3448188+07	.1013977+09	-.8303028+06	-.7395172+07
FORCR2	.1127968+07	.6047634+06	-.1311230+07	.4624413+07	.8257788+06	-.8303028+06	.1554795+07	.4838068+07
MOME 2	.1973977+07	.6887369+07	-.4624413+07	.8257989+07	-.2779775+06	-.7395172+07	.4838068+07	.1557558+08

SEGMENT SYMMETRY CHECK

.4294642+08	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1013977+09	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1554795+07	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1557558+08	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.4294642+08	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1013977+09	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1554795+07	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1557558+08

RZERO(I) = 7.100000+01 RZERO(J) = 7.100000+01

REGION NUMBER 3

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

HARMONIC (N) = 10

ESTIMATE 1

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.4294642+08	-.3448188+07	.8257788+06	.2779775+06	-.2343307+08	-.1782316+08	.1127968+07	.1973977+07
FORCZ1	-.3448188+07	.1013977+09	.8303028+06	-.7395172+07	.1782316+08	-.9382879+08	.6047634+06	.6887369+07
FORCR1	.8257788+06	.8303028+06	.1554795+07	-.4838068+07	.1127968+07	-.6047634+06	-.1311230+07	-.4624413+07
MOME 1	.2779775+06	-.7395172+07	-.4838068+07	.1557558+08	-.1973977+07	.6887369+07	.4624413+07	.8257989+07
FORCT2	-.2343307+08	.1782316+08	.1127968+07	-.1973977+07	.4294642+08	.3448188+07	.8257788+06	-.2779775+06
FORCZ2	-.1782316+08	-.9382879+08	-.6047634+06	.6887369+07	.3448188+07	.1013977+09	-.8303028+06	-.7395172+07
FORCR2	.1127968+07	.6047634+06	-.1311230+07	.4624413+07	.8257788+06	-.8303028+06	.1554795+07	.4838068+07
MOME 2	.1973977+07	.6887369+07	-.4624413+07	.8257989+07	-.2779775+06	-.7395172+07	.4838068+07	.1557558+08

SEGMENT SYMMETRY CHECK

.4294642+08	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1013977+09	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1554795+07	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1557558+08	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.4294642+08	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1013977+09	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1554795+07	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1557558+08

RZERO(I) = 7.100000+01 RZERO(J) = 7.100000+01

REGION NUMBER 4

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

HARMONIC (N) = 10

ESTIMATE 1

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.4294642+08	-.3448188+07	.8257788+06	.2779775+06	-.2343307+08	-.1782316+08	.1127968+07	.1973977+07
FORCZ1	-.3448188+07	.1013977+09	.8303028+06	-.7395172+07	.1782316+08	-.9382879+08	.6047634+06	.6887369+07
FORCR1	.8257788+06	.8303028+06	.1554798+07	-.4838068+07	.1127968+07	-.6047634+06	-.1311230+07	-.4624413+07
MOME 1	.2779775+06	-.7395172+07	-.4838068+07	.1557558+08	-.1973977+07	.6887369+07	.4624413+07	.8257989+07
FORCT2	-.2343307+08	.1782316+08	.1127968+07	-.1973977+07	.4294642+08	.3448188+07	.8257788+06	-.2779775+06
FORCZ2	-.1782316+08	-.9382879+08	-.6047634+06	.6887369+07	.3448188+07	.1013977+09	-.8303028+06	-.7395172+07
FORCR2	.1127968+07	.6047634+06	-.1311230+07	.4624413+07	.8257788+06	-.8303028+06	.1554795+07	.4838068+07
MOME 2	.1973977+07	.6887369+07	-.4624413+07	.8257989+07	-.2779775+06	-.7395172+07	.4838068+07	.1557558+08

SEGMENT SYMMETRY CHECK

.4294642+08	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1013977+09	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1554795+07	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1557558+08	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.4294642+08	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1013977+09	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1554795+07	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1557558+08

RZERO(I) = 7.100000+01 RZERO(J) = 7.100000+01

THE REDUCED STIFFNESS MATRIX

ROW	COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8
1	.1013977+09	-.7395172+07	.1782316+08	-.9382879+08	.6047634+06	.6887369+07	.0000000	.0000000
2	-.7395172+07	.1557558+08	-.1973977+07	.6887369+07	.4624413+07	.8257989+07	.0000000	.0000000
3	.1782316+08	-.1973977+07	.8589284+08	.0000000	.1651558+07	.0000000	-.2343307+08	.1127968+07
4	-.9382879+08	.6887369+07	.0000000	.2027953+09	.0000000	-.1479034+08	.1782316+08	.6047634+06
5	.6047634+06	.4624413+07	.1651558+07	.0000000	.3109589+07	.0000000	.1127968+07	-.1311230+07
6	.6887369+07	.8257989+07	.0000000	-.1479034+08	.0000000	.3115116+08	-.1973977+07	.4624413+07
7	.0000000	.0000000	-.2343307+08	.1782316+08	.1127968+07	-.1973977+07	.8589284+08	.1651558+07
8	.0000000	.0000000	.1127968+07	.6047634+06	-.1311230+07	.4624413+07	.1651558+07	.3109589+07
9	.0000000	.0000000	.1973977+07	.6887369+07	-.4624413+07	.8257989+07	.0000000	.0000000
10	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	-.2343307+08	.1127968+07
11	.0000000	.0000000	.0000000	.0000000	.8000000	.0000000	-.1782316+08	-.6047634+06
12	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.1127968+07	-.1311230+07
13	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.1973977+07	-.4624413+07
14	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
15	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000

ROW	COLUMN 9	COLUMN 10	COLUMN 11	COLUMN 12	COLUMN 13	COLUMN 14	COLUMN 15
1	.0000000	.0000000	.0000000	.0000000	.0000000	.0080000	.0000000
2	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
3	.1973977+07	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
4	.6887369+07	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
5	-.4624413+07	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
6	.8257989+07	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
7	.0000000	-.2343307+08	-.1782316+08	.1127968+07	.1973977+07	.0000000	.0000000
8	.0000000	.1127968+07	-.6047634+06	-.1311230+07	-.4624413+07	.0000000	.0000000
9	.3115116+08	-.1973977+07	.6887369+07	.4624413+07	.8257989+07	.0000000	.0000000
10	-.1973977+07	.8589284+08	.0000000	.1651558+07	.0000000	-.1782316+08	.1973977+07
11	.6887369+07	.0000000	.2027953+09	.0000000	-.1479034+08	-.9382879+08	.6887369+07
12	.4624413+07	.1651558+07	.0000000	.3109589+07	.0000000	-.6047634+06	-.4624413+07
13	.8257989+07	.0000000	-.1479034+08	.0000000	.3115116+08	.6887369+07	.8257989+07
14	.0000000	-.1782316+08	-.9382879+08	-.6047634+06	.6887369+07	.1013977+09	-.7395172+07
15	.0000000	.1973977+07	.6887369+07	-.4624413+07	.8257989+07	-.7395172+07	.1557558+08

DIVE LOAD PRESTRESS STIFFNESS MATRIX

1	1.013977+08							
2	-7.395172+06	1.557558+07						
3	1.782316+07	-1.973977+06	8.589284+07					
4	-9.382879+07	6.887369+06	0.000000	2.027953+08				
5	6.047634+05	4.624413+06	1.651558+06	0.000000	3.109589+06			
6	6.887369+06	8.257989+06	0.000000	-1.479034+07	0.000000	3.115116+07		
7	0.000000	0.000000	-2.343307+07	1.782316+07	1.127968+06	-1.973977+06	8.589284+07	
8	0.000000	0.000000	1.127968+06	6.047634+05	-1.311230+06	4.624413+06	1.651558+06	3.109589+06
9	0.000000	0.000000	1.973977+06	6.887369+06	-4.624413+06	8.257989+06	0.000000	0.000000
	3.115116+07							
10	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	-2.343307+07	1.127968+06
	-1.973977+06	8.589284+07						
11	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	-1.782316+07	-6.047634+05
	6.887369+06	0.000000	2.027953+08					
12	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	1.127968+06	-1.311230+06
	4.624413+06	1.651558+06	0.000000	3.109589+06				
13	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	1.973977+06	-4.624413+06
	8.257989+06	0.000000	-1.479034+07	0.000000	3.115116+07			
14	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
	0.000000	-1.782316+07	-9.382879+07	-6.047634+05	6.887369+06	1.013977+08		
15	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
	0.000000	1.973977+06	6.887369+06	-4.624413+06	8.257989+06	-7.395172+06	1.557558+07	

```
DEAD LOAD PRESTRESS OR BASE STIFFNESS MATRIX
  1   1.013995+08
  2  -7.357433+06   1.726297+07
  3   1.782556+07  -1.929293+06   8.589910+07
  4  -9.383065+07   6.849929+06   0.000000      2.027990+08
  5   6.051150+05   4.879876+06   1.649370+06   0.000000      4.285204+06
  6   6.849929+06   7.820978+06   0.000000     -1.471487+07   0.000000      3.452594+07
  7   0.000000      0.000000     -2.343001+07   1.782556+07   1.129815+06  -1.929293+06   8.589910+07
  8   0.000000      0.000000      1.129815+06   6.051150+05  -1.898946+06   4.879876+06   1.649370+06   4.285204+06

  9   0.000000      0.000000      1.929293+06   6.849929+06  -4.879876+06   7.820978+06   0.000000      0.000000
      3.452594+07
 10   0.000000      0.000000      0.000000      0.000000      0.000000      0.000000     -2.343001+07   1.129815+06
     -1.929293+06   8.589910+07
 11   0.000000      0.000000      0.000000      0.000000      0.000000      0.000000     -1.782556+07  -6.051150+05
      6.849929+06   0.000000      2.027990+08
 12   0.000000      0.000000      0.000000      0.000000      0.000000      0.000000      1.129815+06  -1.898946+06
      4.879876+06   1.649370+06   0.000000      4.285204+06
 13   0.000000      0.000000      0.000000      0.000000      0.000000      0.000000      1.929293+06  -4.879876+06
      7.820978+06   0.000000     -1.471487+07   0.000000      3.452594+07
 14   0.000000      0.000000      0.000000      0.000000      0.000000      0.000000      0.000000      0.000000
      0.000000     -1.782556+07  -9.383065+07  -6.051150+05   6.849929+06   1.013995+08
 15   0.000000      0.000000      0.000000      0.000000      0.000000      0.000000      0.000000      0.000000
      0.000000      1.929293+06   6.849929+06  -4.879876+06   7.820978+06  -7.357433+06   1.726297+07
```

```
EIGENVALUES
   9.992594-01   1.147480+00   2.040828+00   3.953625+00   6.346835+00   1.061751+01   1.646772+01   2.005655+01
   5.804874+03   2.270012+04   8.438697+04   1.910169+05   2.497459+06   1.159601+07   6.089791+07

EIGENVECTOR   1
   2.496201-06  -2.027406-04  -6.459934-05   1.765081-06   9.126532-04  -1.433593-04  -9.135727-05   1.290687-03
  -2.782766-11  -6.459935-05  -1.765077-06   9.126534-04   1.433593-04  -2.496192-06   2.027407-04

EIGENVECTOR   2
   2.589908-05   1.907974-04   1.500374-05   1.182208-05  -6.054497-04  -8.844025-07   1.262487-11  -2.071000-10
  -1.879646-04  -1.500372-05   1.182208-05   6.054495-04  -8.844594-07   2.589908-05   1.907973-04

   THE CURRENT LOAD MULTIPLICATION FACTOR =   9.992594-01
```

REGION NUMBER 1

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 31 SHUTTLE CYLINDER

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
1.0000000+00	0.0000000	-2.4962012-06	0.0000000	-2.02741-04	0.0000000	-2.5899078-05	0.0000000	1.90797-04
1.5500000+00	-7.8828807-06	-2.4866708-06	-1.1136940-04	-2.01988-04	2.5501256-06	-2.5652796-05	1.0426278-04	1.87442-04
2.0500000+00	-1.4999609-05	-2.4616438-06	-2.1191785-04	-2.00000-04	4.8089992-06	-2.5083286-05	1.9624744-04	1.79775-04
2.5500000+00	-2.2023766-05	-2.4212111-06	-3.1116426-04	-1.96782-04	6.9532158-06	-2.4198179-05	2.8333131-04	1.67874-04
3.0500000+00	-2.8912021-05	-2.3656537-06	-4.0849853-04	-1.92355-04	8.9297685-06	-2.3017603-05	3.6345622-04	1.51987-04
3.5500000+00	-3.5621852-05	-2.2953568-06	-5.0332219-04	-1.86745-04	1.0690079-05	-2.1568164-05	4.3470820-04	1.32443-04
4.0500000+00	-4.2111837-05	-2.2108066-06	-5.9505202-04	-1.79986-04	1.2191205-05	-1.9882489-05	4.9535650-04	1.09645-04
4.5500000+00	-4.8341899-05	-2.1125871-06	-6.8312362-04	-1.72120-04	1.3396933-05	-1.7998655-05	5.4388924-04	8.40643-05
5.0500000+00	-5.4273556-05	-2.0013756-06	-7.6699488-04	-1.63193-04	1.4278740-05	-1.5959531-05	5.7904492-04	5.62295-05
5.5500000+00	-5.9870152-05	-1.8779378-06	-8.4614923-04	-1.53261-04	1.4816593-05	-1.3812037-05	5.9983925-04	2.67188-05
6.0000000+00	-6.4591965-05	-1.7570901-06	-9.1295135-04	-1.43513-04	1.4997374-05	-1.1828032-05	6.0570230-04	-7.65444-07

REGION NUMBER 2

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 31 SHUTTLE CYLINDER

	V-E-C-T-O-R 1				V-E-C-T-O-R 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
1.0000000+00	-6.4599343-05	-1.7650807-06	-9.1265319-04	-1.43359-04	1.5003739-05	-1.1822078-05	6.0544968-04	-8.84402-07
1.5500000+00	-6.9932455-05	-1.6059386-06	-9.8799987-04	-1.30459-04	1.4823436-05	-9.4327258-06	5.9572157-04	-3.42978-05
2.0500000+00	-7.4329006-05	-1.4507333-06	-1.0501177-03	-1.17885-04	1.4283919-05	-7.3810991-06	5.7124754-04	-6.33301-05
2.5500000+00	-7.8267237-05	-1.2865014-06	-1.1057641-03	-1.04586-04	1.3395271-05	-5.4948133-06	5.3270894-04	-9.04589-05
3.0500000+00	-8.1722849-05	-1.1142749-06	-1.1545967-03	-9.06439-05	1.2174880-05	-3.8188794-06	4.8119936-04	-1.15125-04
3.5500000+00	-8.4674515-05	-9.3513935-07	-1.1963150-03	-7.61437-05	1.0648231-05	-2.3936690-06	4.1807882-04	-1.36824-04
4.0500000+00	-8.7104008-05	-7.5022698-07	-1.2306623-03	-6.11749-05	8.8479920-06	-1.2541989-06	3.4494418-04	-1.55114-04
4.5500000+00	-8.8996320-05	-5.6070927-07	-1.2574271-03	-4.58294-05	6.8129557-06	-4.2950489-07	2.6359515-04	-1.69626-04
5.0500000+00	-9.0339747-05	-3.6778953-07	-1.2764446-03	-3.02015-05	4.5868571-06	5.7886280-08	1.7599647-04	-1.80071-04
5.5500000+00	-9.1125965-05	-1.7269504-07	-1.2875976-03	-1.43874-05	2.2170869-06	1.9237449-07	8.4236974-05	-1.86242-04
6.0000000+00	-9.1353030-05	3.7219615-09	-1.2908531-03	-7.57515-08	2.4936141-09	4.6104060-09	-1.1180814-07	-1.88044-04

REGION NUMBER 3

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1   SEGMENT CODE 31   SHUTTLE CYLINDER

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
1.0000000+00	-9.1357275-05	0.0000000	-1.2906866-03	-2.78277-11	1.2624869-11	0.0000000	2.0709998-10	-1.87965-04
1.5500000+00	-9.1016553-05	2.1553047-07	-1.2858735-03	1.74916-05	-2.6985942-06	1.9077994-07	-1.0289198-04	-1.85299-04
2.0500000+00	-9.0117490-05	4.0999677-07	-1.2731729-03	3.32851-05	-5.0440973-06	-1.3908870-08	-1.9396743-04	-1.78283-04
2.5500000+00	-8.8662827-05	6.0182275-07	-1.2526224-03	4.88750-05	-7.2359585-06	-5.6882525-07	-2.8046778-04	-1.67028-04
3.0500000+00	-8.6661546-05	7.8983000-07	-1.2243478-03	6.41653-05	-9.2274213-06	-1.4570366-06	-3.6032601-04	-1.51758-04
3.5500000+00	-8.4125999-05	9.7286841-07	-1.1885228-03	7.90615-05	-1.0975640-05	-2.6547589-06	-4.3160725-04	-1.32778-04
4.0500000+00	-8.1071836-05	1.1498231-06	-1.1453673-03	9.34718-05	-1.2442945-05	-4.1317956-06	-4.9254906-04	-1.10471-04
4.5500000+00	-7.7517905-05	1.3196214-06	-1.0951469-03	1.07307-04	-1.3598008-05	-5.8520850-06	-5.4159859-04	-8.52899-05
5.0500000+00	-7.3486140-05	1.4812388-06	-1.0381704-03	1.20482-04	-1.4416866-05	-7.7743435-06	-5.7744577-04	-5.77518-05
5.5500000+00	-6.9001423-05	1.6337054-06	-9.7478872-04	1.32915-04	-1.4883812-05	-9.8527976-06	-5.9905191-04	-2.84243-05
6.0000000+00	-6.4600727-05	1.7623483-06	-9.1259066-04	1.43406-04	-1.4997409-05	-1.1816136-05	-6.0570025-04	-1.00296-06

REGION NUMBER 4

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 31 SHUTTLE CYLINDER

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
1.0000000+00	-6.4599352-05	1.7650771-06	-9.1265341-04	1.43359-04	-1.5003721-05	-1.1822077-05	-6.0544947-04	-8.84459-07
1.5500000+00	-5.8784386-05	1.9107405-06	-8.3049996-04	1.55195-04	-1.4741603-05	-1.4242024-05	-5.9667617-04	3.26190-05
2.0500000+00	-5.3116368-05	2.0305516-06	-7.5042075-04	1.64957-04	-1.4132423-05	-1.6372317-05	-5.7299478-04	6.18577-05
2.5500000+00	-4.7120932-05	2.1376024-06	-6.6571150-04	1.73706-04	-1.3182923-05	-1.8384903-05	-5.3511729-04	8.93047-05
3.0500000+00	-4.0835080-05	2.2312582-06	-5.7689263-04	1.81387-04	-1.1914853-05	-2.0233538-05	-4.8408390-04	1.14390-04
3.5500000+00	-3.4297609-05	2.3109782-06	-4.8451000-04	1.87954-04	-1.0358320-05	-2.1876176-05	-4.2120743-04	1.36595-04
4.0500000+00	-2.7548876-05	2.3763180-06	+3.8913167-04	1.93364-04	-8.5509456-06	-2.3275700-05	-3.4884549-04	1.55461-04
4.5500000+00	-2.0630546-05	2.4269317-06	-2.9134437-04	1.97584-04	-6.5368847-06	-2.4400567-05	-2.6636813-04	1.70598-04
5.0500000+00	-1.3585342-05	2.4625741-06	-1.9174996-04	2.00589-04	-4.3657022-06	-2.5225349-05	-1.7812146-04	1.81693-04
5.5500000+00	-6.4567764-06	2.4831007-06	-9.0961750-05	2.02357-04	-2.0911496-06	-2.5731179-05	-8.5388043-05	1.88514-04
6.0000000+00	-6.1864161-09	2.4886129-06	2.5517962-07	2.02883-04	-2.4352350-09	-2.5903673-05	1.1029100-07	1.90877-04

REGION NUMBER 1

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

HARMONIC (N) = 11

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.4522340+08	-.4150582+07	.8866210+06	.3772671+06	-.2210441+08	-.1913657+08	.1217389+07	.2091739+07
FORCZ1	-.4150582+07	.1017547+09	.8157920+06	-.7372812+07	.1913657+08	-.9262081+08	.5438035+06	.6759837+07
FORCR1	.8866210+06	.8157920+06	.2149583+07	-.5087451+07	.1217389+07	-.5438035+06	-.1899813+07	-.4880684+07
MOME 1	.3772671+06	-.7372812+07	-.5087451+07	.1727028+08	-.2091739+07	.6759837+07	.4880684+07	.7821616+07
FORCT2	-.2210441+08	.1913657+08	.1217389+07	-.2091739+07	.4522340+08	.4150582+07	.8866210+06	-.3772671+06
FORCZ2	-.1913657+08	-.9262081+08	-.5438035+06	.6759837+07	.4150582+07	.1017547+09	-.8157920+06	-.7372812+07
FORCR2	.1217389+07	.5438035+06	-.1899813+07	.4880684+07	.8866210+06	-.8157920+06	.2149583+07	.5087451+07
MOME 2	.2091739+07	.6759837+07	-.4880684+07	.7821616+07	-.3772671+06	-.7372812+07	.5087451+07	.1727028+08

SEGMENT SYMMETRY CHECK

.4522340+08	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1017547+09	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.2149583+07	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1727028+08	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.4522340+08	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1017547+09	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.2149583+07	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1727028+08

RZERO(I) = 7.100000+01 RZERO(J) = 7.100000+01

REGION NUMBER 2

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

HARMONIC (N) = 11

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.4522340+08	-.4150582+07	.8866210+06	.3772671+06	-.2210441+08	-.1913657+08	.1217389+07	.2091739+07
FORCZ1	-.4150582+07	.1017547+09	.8157920+06	-.7372812+07	.1913657+08	-.9262081+08	.5438035+06	.6759837+07
FORCR1	.8866210+06	.8157920+06	.2149583+07	-.5087451+07	.1217389+07	-.5438035+06	-.1899813+07	-.4880684+07
MOME 1	.3772671+06	-.7372812+07	-.5087451+07	.1727028+08	-.2091739+07	.6759837+07	.4880684+07	.7821616+07
FORCT2	-.2210441+08	.1913657+08	.1217389+07	-.2091739+07	.4522340+08	.4150582+07	.8866210+06	-.3772671+06
FORCZ2	-.1913657+08	-.9262081+08	-.5438035+06	.6759837+07	.4150582+07	.1017547+09	-.8157920+06	-.7372812+07
FORCR2	.1217389+07	.5438035+06	-.1899813+07	.4880684+07	.8866210+06	-.8157920+06	.2149583+07	.5087451+07
MOME 2	.2091739+07	.6759837+07	-.4880684+07	.7821616+07	-.3772671+06	-.7372812+07	.5087451+07	.1727028+08

SEGMENT SYMMETRY CHECK

.4522340+08	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1017547+09	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.2149583+07	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1727028+08	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.4522340+08	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1017547+09	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.2149583+07	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1727028+08

RZERO(I) = 7.100000+01 RZERO(J) = 7.100000+01

REGION NUMBER 3

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

HARMONIC (N) = 11

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.4522340+08	-.4150582+07	.8866210+06	.3772671+06	-.2210441+08	-.1913657+08	.1217389+07	.2091739+07
FORCZ1	-.4150582+07	.1017547+09	.8157920+06	-.7372812+07	.1913657+08	-.9262081+08	.5438035+06	.6759837+07
FORCR1	.8866210+06	.8157920+06	.2149583+07	-.5087451+07	.1217389+07	-.5438035+06	-.1899813+07	-.4880684+07
MOME 1	.3772671+06	-.7372812+07	-.5087451+07	.1727028+08	-.2091739+07	.6759837+07	.4880684+07	.7821616+07
FORCT2	-.2210441+08	.1913657+08	.1217389+07	-.2091739+07	.4522340+08	.4150582+07	.8866210+06	-.3772671+06
FORCZ2	-.1913657+08	-.9262081+08	-.5438035+06	.6759837+07	.4150582+07	.1017547+09	-.8157920+06	-.7372812+07
FORCR2	.1217389+07	.5438035+06	-.1899813+07	.4880684+07	.8866210+06	-.8157920+06	.2149583+07	.5087451+07
MOME 2	.2091739+07	.6759837+07	-.4880684+07	.7821616+07	-.3772671+06	-.7372812+07	.5087451+07	.1727028+08

SEGMENT SYMMETRY CHECK

.4522340+08	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1017547+09	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.2149583+07	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1727028+08	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.4522340+08	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1017547+09	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.2149583+07	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1727028+08

RZERO(I) = 7.100000+01 RZERO(J) = 7.100000+01

REGION NUMBER 4

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

HARMONIC (N) = 11

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.4522340+08	-.4150582+07	.8866210+06	.3772671+06	-.2210441+08	-.1913657+08	.1217389+07	.2091739+07
FORCZ1	-.4150582+07	.1017547+09	.8157920+06	-.7372812+07	.1913657+08	-.9262081+08	.5438035+06	.6759837+07
FORCR1	.8866210+06	.8157920+06	.2149583+07	-.5087451+07	.1217389+07	-.5438035+06	-.1899813+07	-.4880684+07
MOME 1	.3772671+06	-.7372812+07	-.5087451+07	.1727028+08	-.2091739+07	.6759837+07	.4880684+07	.7821616+07
FORCT2	-.2210441+08	.1913657+08	.1217389+07	-.2091739+07	.4522340+08	.4150582+07	.8866210+06	-.3772671+06
FORCZ2	-.1913657+08	-.9262081+08	-.5438035+06	.6759837+07	.4150582+07	.1017547+09	-.8157920+06	-.7372812+07
FORCR2	.1217389+07	.5438035+06	-.1899813+07	.4880684+07	.8866210+06	-.8157920+06	.2149583+07	.5087451+07
MOME 2	.2091739+07	.6759837+07	-.4880684+07	.7821616+07	-.3772671+06	-.7372812+07	.5087451+07	.1727028+08

SEGMENT SYMMETRY CHECK

.4522340+08	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1017547+09	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.2149583+07	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1727028+08	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.4522340+08	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1017547+09	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.2149583+07	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1727028+08

RZERO(I) = 7.100000+01 RZERO(J) = 7.100000+01

THE REDUCED STIFFNESS MATRIX

ROW	COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8
1	.1017547+09	-.7372812+07	.1913657+08	-.9262081+08	.5438035+06	.6759837+07	.0000000	.0000000
2	-.7372812+07	.1727028+08	-.2091738+07	.6759837+07	.4880684+07	.7821616+07	.0000000	.0000000
3	.1913657+08	-.2091738+07	.9044680+08	.0000000	.1773242+07	.0000000	-.2210441+08	.1217389+07
4	-.9262081+08	.6759837+07	.0000000	.2035094+09	.0000000	-.1474562+08	.1913657+08	.5438035+06
5	.5438035+06	.4880684+07	.1773242+07	.0000000	.4299166+07	.0000000	.1217389+07	-.1899813+07
6	.6759837+07	.7821616+07	.0000000	-.1474562+08	.0000000	.3454056+08	-.2091738+07	.4880684+07
7	.0000000	.0000000	-.2210441+08	.1913657+08	.1217389+07	-.2091738+07	.9044680+08	.1773242+07
8	.0000000	.0000000	.1217389+07	.5438035+06	-.1899813+07	.4880684+07	.1773242+07	.4299166+07
9	.0000000	.0000000	.2091738+07	.6759837+07	-.4880684+07	.7821616+07	.0000000	.0000000
10	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	-.2210441+08	.1217389+07
11	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	-.1913657+08	-.5438035+06
12	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.1217389+07	-.1899813+07
13	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.2091738+07	-.4880684+07
14	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
15	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000

ROW	COLUMN 9	COLUMN 10	COLUMN 11	COLUMN 12	COLUMN 13	COLUMN 14	COLUMN 15
1	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
2	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
3	.2091738+07	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
4	.6759837+07	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
5	-.4880684+07	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
6	.7821616+07	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
7	.0000000	-.2210441+08	-.1913657+08	.1217389+07	.2091738+07	.0000000	.0000000
8	.0000000	.1217389+07	-.5438035+06	-.1899813+07	-.4880684+07	.0000000	.0000000
9	.3454056+08	-.2091738+07	.6759837+07	.4880684+07	.7821616+07	.0000000	.0000000
10	-.2091738+07	.9044680+08	.0000000	.1773242+07	.0000000	-.1913657+08	.2091738+07
11	.6759837+07	.0000000	.2035094+09	.0000000	-.1474562+08	-.9262081+08	.6759837+07
12	.4880684+07	.1773242+07	.0000000	.4299166+07	.0000000	-.5438035+06	-.4880684+07
13	.7821616+07	.0000000	-.1474562+08	.0000000	.3454056+08	.6759837+07	.7821616+07
14	.0000000	-.1913657+08	-.9262081+08	-.5438035+06	.6759837+07	.1017547+09	-.7372812+07
15	.0000000	.2091738+07	.6759837+07	-.4880684+07	.7821616+07	-.7372812+07	.1727028+08

HARMONIC (N) = 11

ESTIMATE 1

REGION NUMBER 1

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

HARMONIC (N) = 11

ESTIMATE 1

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.4521959+08	-.4153182+07	.8878436+06	.3197796+06	-.2210813+08	-.1913397+08	.1215302+07	.2140926+07
FORCZ1	-.4153182+07	.1017529+09	.8155677+06	-.7409906+07	.1913397+08	-.9261901+08	.5434313+06	.6796560+07
FORCR1	.8878436+06	.8155677+06	.1561800+07	-.4844036+07	.1215302+07	-.5434313+06	-.1312129+07	-.4625028+07
MOME 1	.3197796+06	-.7409906+07	-.4844036+07	.1558358+08	-.2140926+07	.6796560+07	.4625028+07	.8258007+07
FORCT2	-.2210813+08	.1913397+08	.1215302+07	-.2140926+07	.4521959+08	.4153182+07	.8878436+06	-.3197796+06
FORCZ2	-.1913397+08	-.9261901+08	-.5434313+06	.6796560+07	.4153182+07	.1017529+09	-.8155677+06	-.7409906+07
FORCR2	.1215302+07	.5434313+06	-.1312129+07	.4625028+07	.8878436+06	-.8155677+06	.1561800+07	.4844036+07
MOME 2	.2140926+07	.6796560+07	-.4625028+07	.8258007+07	-.3197796+06	-.7409906+07	.4844036+07	.1558358+08

SEGMENT SYMMETRY CHECK

.4521959+08	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1017529+09	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1561800+07	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1558358+08	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.4521959+08	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1017529+09	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1561800+07	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1558358+08

RZERO(I) = 7.100000+01 RZERO(J) = 7.100000+01

REGION NUMBER 2

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

HARMONIC (N) = 11

ESTIMATE 1

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.4521959+08	-.4153182+07	.8878436+06	.3197796+06	-.2210813+08	-.1913397+08	.1215302+07	.2140926+07
FORCZ1	-.4153182+07	.1017529+09	.8155677+06	-.7409906+07	.1913397+08	-.9261901+08	.5434313+06	.6796560+07
FORCR1	.8878436+06	.8155677+06	.1561800+07	-.4844036+07	.1215302+07	-.5434313+06	-.1312129+07	-.4625028+07
MOME 1	.3197796+06	-.7409906+07	-.4844036+07	.1558358+08	-.2140926+07	.6796560+07	.4625028+07	.8258007+07
FORCT2	-.2210813+08	.1913397+08	.1215302+07	-.2140926+07	.4521959+08	.4153182+07	.8878436+06	-.3197796+06
FORCZ2	-.1913397+08	-.9261901+08	-.5434313+06	.6796560+07	.4153182+07	.1017529+09	-.8155677+06	-.7409906+07
FORCR2	.1215302+07	.5434313+06	-.1312129+07	.4625028+07	.8878436+06	-.8155677+06	.1561800+07	.4844036+07
MOME 2	.2140926+07	.6796560+07	-.4625028+07	.8258007+07	-.3197796+06	-.7409906+07	.4844036+07	.1558358+08

SEGMENT SYMMETRY CHECK

.4521959+08	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1017529+09	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1561800+07	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1558358+08	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.4521959+08	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1017529+09	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1561800+07	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1558358+08

RZERO(I) = 7.100000+01 RZERO(J) = 7.100000+01

REGION NUMBER 3

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

HARMONIC (N) = 11

ESTIMATE 1

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.4521959+08	-.4153182+07	.8878436+06	.3197796+06	-.2210813+08	-.1913397+08	.1215302+07	.2140926+07
FORCZ1	-.4153182+07	.1017529+09	.8155677+06	-.7409906+07	.1913397+08	-.9261901+08	.5434313+06	.6796560+07
FORCR1	.8878436+06	.8155677+06	.1561800+07	-.4844036+07	.1215302+07	-.5434313+06	-.1312129+07	-.4625028+07
MOME 1	.3197796+06	-.7409906+07	-.4844036+07	.1558358+08	-.2140926+07	.6796560+07	.4625028+07	.8258007+07
FORCT2	-.2210813+08	.1913397+08	.1215302+07	-.2140926+07	.4521959+08	.4153182+07	.8878436+06	-.3197796+06
FORCZ2	-.1913397+08	-.9261901+08	-.5434313+06	.6796560+07	.4153182+07	.1017529+09	-.8155677+06	-.7409906+07
FORCR2	.1215302+07	.5434313+06	-.1312129+07	.4625028+07	.8878436+06	-.8155677+06	.1561800+07	.4844036+07
MOME 2	.2140926+07	.6796560+07	-.4625028+07	.8258007+07	-.3197796+06	-.7409906+07	.4844036+07	.1558358+08

SEGMENT SYMMETRY CHECK

.4521959+08	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1017529+09	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1561800+07	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1558358+08	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.4521959+08	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1017529+09	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1561800+07	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1558358+08

RZERO(I) = 7.100000+01 RZERO(J) = 7.100000+01

REGION NUMBER 4

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

HARMONIC (N) = 11

ESTIMATE 1

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.4521959+08	-.4153182+07	.8878436+06	.3197796+06	-.2210813+08	-.1913397+08	.1215302+07	.2140926+07
FORCZ1	-.4153182+07	.1017529+09	.8155677+06	-.7409906+07	.1913397+08	-.9261901+08	.5434313+06	.6796560+07
FORCR1	.8878436+06	.8155677+06	.1561800+07	-.4844036+07	.1215302+07	-.5434313+06	-.1312129+07	-.4625028+07
MOME 1	.3197796+06	-.7409906+07	-.4844036+07	.1558358+08	-.2140926+07	.6796560+07	.4625028+07	.8258007+07
FORCT2	-.2210813+08	.1913397+08	.1215302+07	-.2140926+07	.4521959+08	.4153182+07	.8878436+06	-.3197796+06
FORCZ2	-.1913397+08	-.9261901+08	-.5434313+06	.6796560+07	.4153182+07	.1017529+09	-.8155677+06	-.7409906+07
FORCR2	.1215302+07	.5434313+06	-.1312129+07	.4625028+07	.8878436+06	-.8155677+06	.1561800+07	.4844036+07
MOME 2	.2140926+07	.6796560+07	-.4625028+07	.8258007+07	-.3197796+06	-.7409906+07	.4844036+07	.1558358+08

SEGMENT SYMMETRY CHECK

.4521959+08	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1017529+09	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1561800+07	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1558358+08	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.4521959+08	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1017529+09	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1561800+07	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1558358+08

RZERO(I) = 7.100000+01 RZERO(J) = 7.100000+01

THE REDUCED STIFFNESS MATRIX

ROW	COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8
1	.1017529+09	-.7409906+07	.1913397+08	-.9261901+08	.5434313+06	.6796560+07	.0000000	.0000000
2	-.7409906+07	.1558358+08	-.2140926+07	.6796560+07	.4625028+07	.8258007+07	.0000000	.0000000
3	.1913397+08	-.2140926+07	.9043919+08	.0000000	.1775687+07	.0000000	-.2210813+08	.1215302+07
4	-.9261901+08	.6796560+07	.0000000	.2035058+09	.0000000	-.1481981+08	.1913397+08	.5434313+06
5	.5434313+06	.4625028+07	.1775687+07	.0000000	.3123600+07	.0000000	.1215302+07	-.1312129+07
6	.6796560+07	.8258007+07	.0000000	-.1481981+08	.0000000	.3116716+08	-.2140926+07	.4625028+07
7	.0000000	.0000000	-.2210813+08	.1913397+08	.1215302+07	-.2140926+07	.9043919+08	.1775687+07
8	.0000000	.0000000	.1215302+07	.5434313+06	-.1312129+07	.4625028+07	.1775687+07	.3123600+07
9	.0000000	.0000000	.2140926+07	.6796560+07	-.4625028+07	.8258007+07	.0000000	.0000000
10	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	-.2210813+08	.1215302+07
11	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	-.1913397+08	-.5434313+06
12	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.1215302+07	-.1312129+07
13	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.2140926+07	-.4625028+07
14	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
15	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000

ROW	COLUMN 9	COLUMN 10	COLUMN 11	COLUMN 12	COLUMN 13	COLUMN 14	COLUMN 15
1	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
2	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
3	.2140926+07	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
4	.6796560+07	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
5	-.4625028+07	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
6	.8258007+07	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
7	.0000000	-.2210813+08	-.1913397+08	.1215302+07	.2140926+07	.0000000	.0000000
8	.0000000	.1215302+07	-.5434313+06	-.1312129+07	-.4625028+07	.0000000	.0000000
9	.3116716+08	-.2140926+07	.6796560+07	.4625028+07	.8258007+07	.0000000	.0000000
10	-.2140926+07	.9043919+08	.0000000	.1775687+07	.0000000	-.1913397+08	.2140926+07
11	.6796560+07	.0000000	.2035058+09	.0000000	-.1481981+08	-.9261901+08	.6796560+07
11	.6796560+07	.0000000	.2035058+09	.0000000	-.1481981+08	-.9261901+08	.6796560+07
12	.4625028+07	.1775687+07	.0000000	.3123600+07	.0000000	-.5434313+06	-.4625028+07
13	.8258007+07	.0000000	-.1481981+08	.0000000	.3116716+08	.6796560+07	.8258007+07
14	.0000000	-.1913397+08	-.9261901+08	-.5434313+06	.6796560+07	.1017529+09	-.7409906+07
15	.0000000	.2140926+07	.6796560+07	-.4625028+07	.8258007+07	-.7409906+07	.1558358+08

LIVE LOAD PRESTRESS STIFFNESS MATRIX

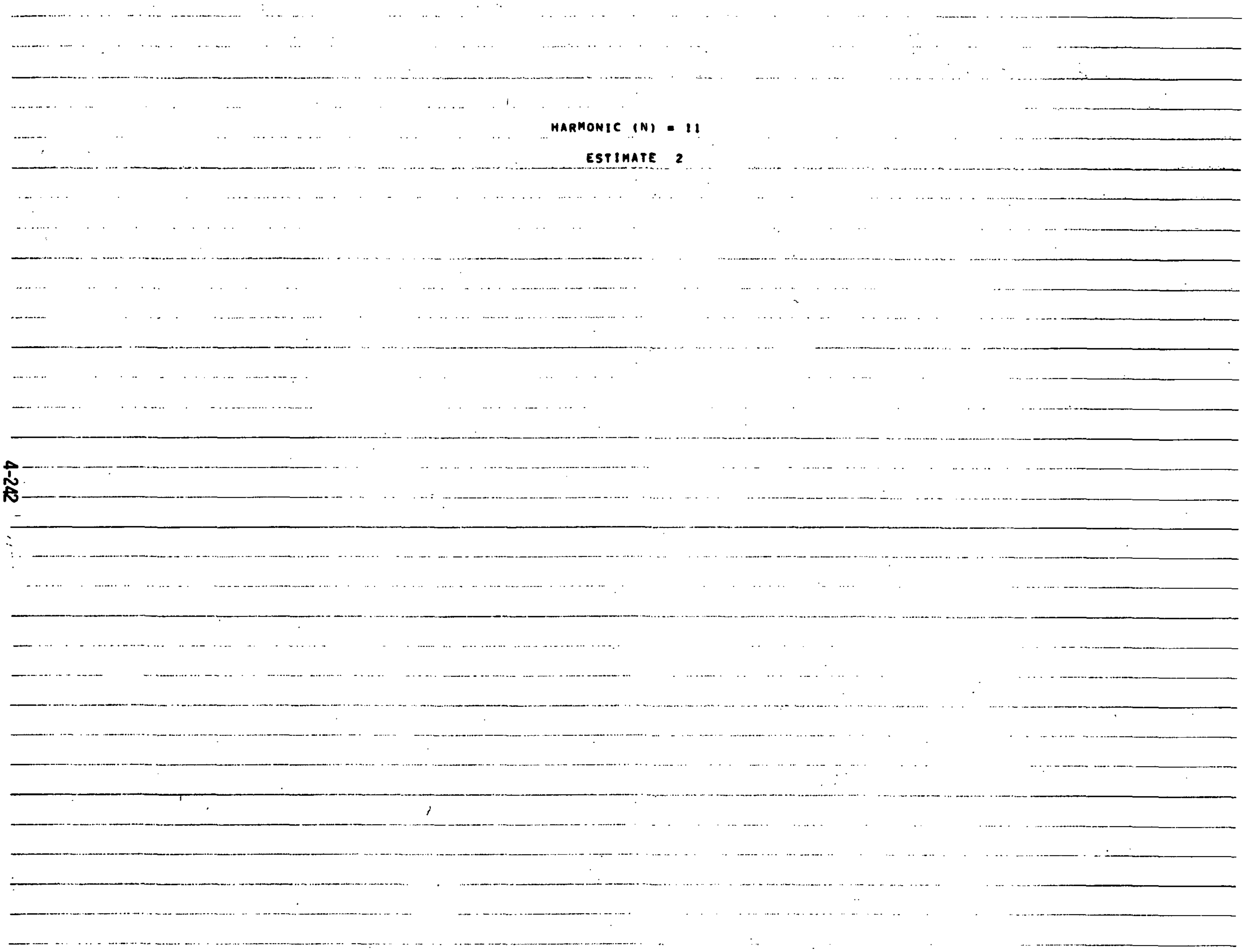
1	1.017529+08							
2	-7.409906+06	1.558358+07						
3	1.913397+07	-2.140926+06	9.043919+07					
4	-9.261901+07	6.796560+06	0.000000	2.035058+08				
5	5.434313+05	4.625028+06	1.775687+06	0.000000	3.123600+06			
6	6.796560+06	8.258007+06	0.000000	-1.481981+07	0.000000	3.116716+07		
7	0.000000	0.000000	-2.210813+07	1.913397+07	1.215302+06	-2.140926+06	9.043919+07	
8	0.000000	0.000000	1.215302+06	5.434313+05	-1.312129+06	4.625028+06	1.775687+06	3.123600+06
9	0.000000	0.000000	2.140926+06	6.796560+06	-4.625028+06	8.258007+06	0.000000	0.000000
	3.116716+07							
10	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	-2.210813+07	1.215302+06
	-2.140926+06	9.043919+07						
11	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	-1.913397+07	-5.434313+05
	6.796560+06	0.000000	2.035058+08					
12	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	1.215302+06	-1.312129+06
	4.625028+06	1.775687+06	0.000000	3.123600+06				
13	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	2.140926+06	-4.625028+06
	8.258007+06	0.000000	-1.481981+07	0.000000	3.116716+07			
14	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
	0.000000	-1.913397+07	-9.261901+07	-5.434313+05	6.796560+06	1.017529+08		
15	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
	0.000000	2.140926+06	6.796560+06	-4.625028+06	8.258007+06	-7.409906+06	1.558358+07	

```
DEAD LOAD PRESTRESS OR BASE STIFFNESS MATRIX
   1    1.017547+08
   2   -7.372812+06   1.727028+07
   3    1.913657+07  -2.091738+06   9.044680+07
   4   -9.262081+07   6.759837+06   0.000000      2.035094+08
   5    5.438035+05   4.880684+06   1.773242+06   0.000000      4.299166+06
   6    6.759837+06   7.821616+06   0.000000     -1.474562+07   0.000000      3.454056+07
   7    0.000000      0.000000     -2.210941+07   1.913657+07   1.217389+06  -2.091738+06   9.044680+07
   8    0.000000      0.000000      1.217389+06   5.438035+05  -1.899813+06   4.880684+06   1.773242+06   4.299166+06

   9    0.000000      0.000000      2.091738+06   6.759837+06  -4.880684+06   7.821616+06   0.000000      0.000000
        3.454056+07
  10    0.000000      0.000000      0.000000      0.000000      0.000000      0.000000     -2.210941+07   1.217389+06
       -2.091738+06   9.044680+07
  11    0.000000      0.000000      0.000000      0.000000      0.000000      0.000000     -1.913657+07  -5.438035+05
        6.759837+06   0.000000      2.035094+08
  12    0.000000      0.000000      0.000000      0.000000      0.000000      0.000000      1.217389+06  -1.899813+06
        4.880684+06   1.773242+06   0.000000      4.299166+06
  13    0.000000      0.000000      0.000000      0.000000      0.000000      0.000000      2.091738+06  -4.880684+06
        7.821616+06   0.000000     -1.474562+07   0.000000      3.454056+07
  14    0.000000      0.000000      0.000000      0.000000      0.000000      0.000000      0.000000      0.000000
        0.000000     -1.913657+07  -9.262081+07  -5.438035+05   6.759837+06   1.017547+08
  15    0.000000      0.000000      0.000000      0.000000      0.000000      0.000000      0.000000      0.000000
        0.000000      2.091738+06   6.759837+06  -4.880684+06   7.821616+06  -7.372812+06   1.727028+07

EIGENVALUES.
    1.010260+00   1.161189+00   2.051401+00   3.965191+00   6.352846+00   1.062635+01   1.646995+01   2.006210+01
    5.315220+03   1.994711+04   7.792924+04   1.991455+05   2.190414+06   1.086539+07   4.423419+07

     THE CURRENT LOAD MULTIPLICATION FACTOR =   1.010260+00
```


HARMONIC (N) = 11
ESTIMATE 2

REGION NUMBER 1

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

HARMONIC (N) = 11

ESTIMATE 2

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.4521955+08	-.4153211+07	.8878563+06	.3191469+06	-.2210818+08	-.1913394+08	.1215280+07	.2141471+07
FORCZ1	-.4153211+07	.1017529+09	.8155652+06	-.7410315+07	.1913394+08	-.9261899+08	.5434273+06	.6796966+07
FORCR1	.8878563+06	.8155652+06	.1555747+07	-.4841487+07	.1215280+07	-.5434273+06	-.1306077+07	-.4622344+07
MOME 1	.3191469+06	-.7410315+07	-.4841487+07	.1556555+08	-.2141471+07	.6796966+07	.4622344+07	.8262927+07
FORCT2	-.2210818+08	.1913394+08	.1215280+07	-.2141471+07	.4521955+08	.4153211+07	.8878563+06	-.3191469+06
FORCZ2	-.1913394+08	-.9261899+08	-.5434273+06	.6796966+07	.4153211+07	.1017529+09	-.8155652+06	-.7410315+07
FORCR2	.1215280+07	.5434273+06	-.1306077+07	.4622344+07	.8878563+06	-.8155652+06	.1555747+07	.4841487+07
MOME 2	.2141471+07	.6796966+07	-.4622344+07	.8262927+07	-.3191489+06	-.7410315+07	.4841487+07	.1556555+08

SEGMENT SYMMETRY CHECK

.4521955+08	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1017529+09	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1555747+07	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1556555+08	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.4521955+08	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1017529+09	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1555747+07	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1556555+08

RZERO(I) = 7.100000+01 RZERO(J) = 7.100000+01

REGION NUMBER 2

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

HARMONIC (N) = 11

ESTIMATE 2

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.4521955+08	-.4153211+07	.8878563+06	.3191469+06	-.2210818+08	-.1913394+08	.1215280+07	.2141471+07
FORCZ1	-.4153211+07	.1017529+09	.8155652+06	-.7410315+07	.1913394+08	-.9261899+08	.5434273+06	.6796966+07
FORCR1	.8878563+06	.8155652+06	.1555747+07	-.4841487+07	.1215280+07	-.5434273+06	-.1306077+07	-.4622344+07
MOME 1	.3191469+06	-.7410315+07	-.4841487+07	.1556555+08	-.2141471+07	.6796966+07	.4622344+07	.8262927+07
FORCT2	-.2210818+08	.1913394+08	.1215280+07	-.2141471+07	.4521955+08	.4153211+07	.8878563+06	-.3191469+06
FORCZ2	-.1913394+08	-.9261899+08	-.5434273+06	.6796966+07	.4153211+07	.1017529+09	-.8155652+06	-.7410315+07
FORCR2	.1215280+07	.5434273+06	-.1306077+07	.4622344+07	.8878563+06	-.8155652+06	.1555747+07	.4841487+07
MOME 2	.2141471+07	.6796966+07	-.4622344+07	.8262927+07	-.3191469+06	-.7410315+07	.4841487+07	.1556555+08

SEGMENT SYMMETRY CHECK

.4521955+08	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1017529+09	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1555747+07	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1556555+08	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.4521955+08	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1017529+09	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1555747+07	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1556555+08

RZERO(I) = 7.100000+01 RZERO(J) = 7.100000+01

REGION NUMBER 3

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

HARMONIC (N) = 11

ESTIMATE 2

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.4621955+08	-.4153211+07	.8878563+06	.3191469+06	-.2210818+08	-.1913394+08	.1215280+07	.2141471+07
FORCZ1	-.4153211+07	.1017529+09	.8155652+06	-.7410315+07	.1913394+08	-.9261899+08	.5434273+06	.6796966+07
FORCR1	.8878563+06	.8155652+06	.1555747+07	-.4841487+07	.1215280+07	-.5434273+06	-.1306077+07	-.4622344+07
MOME 1	.3191469+06	-.7410315+07	-.4841487+07	.1556555+08	-.2141471+07	.6796966+07	.4622344+07	.8262927+07
FORCT2	-.2210818+08	.1913394+08	.1215280+07	-.2141471+07	.4521955+08	.4153211+07	.8878563+06	-.3191469+06
FORCZ2	-.1913394+08	-.9261899+08	-.5434273+06	.6796966+07	.4153211+07	.1017529+09	-.8155652+06	-.7410315+07
FORCR2	.1215280+07	.5434273+06	-.1306077+07	.4622344+07	.8878563+06	-.8155652+06	.1555747+07	.4841487+07
MOME 2	.2141471+07	.6796966+07	-.4622344+07	.8262927+07	-.3191469+06	-.7410315+07	.4841487+07	.1556555+08

SEGMENT SYMMETRY CHECK

.4521955+08	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1017529+09	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1555747+07	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1556555+08	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.4521955+08	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1017529+09	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1555747+07	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1556555+08

RZERO(I) = 7.100000+01 RZERO(J) = 7.100000+01

REGION NUMBER 4

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

HARMONIC (N) = 11

ESTIMATE 2

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.4521955+08	-.4153211+07	.8878563+06	.3191469+06	-.2210818+08	-.1913394+08	.1215280+07	.2141471+07
FORCZ1	-.4153211+07	.1017529+09	.8155652+06	-.7410315+07	.1913394+08	-.9261899+08	.5434273+06	.6796966+07
FORCR1	.8878563+06	.8155652+06	.1555747+07	-.4841487+07	.1215280+07	-.5434273+06	-.1306077+07	-.4622344+07
MOME 1	.3191469+06	-.7410315+07	-.4841487+07	.1556555+08	-.2141471+07	.6796966+07	.4622344+07	.8262927+07
FORCT2	-.2210818+08	.1913394+08	.1215280+07	-.2141471+07	.4521955+08	.4153211+07	.8878563+06	-.3191469+06
FORCZ2	-.1913394+08	-.9261899+08	-.5434273+06	.6796966+07	.4153211+07	.1017529+09	-.8155652+06	-.7410315+07
FORCR2	.1215280+07	.5434273+06	-.1306077+07	.4622344+07	.8878563+06	-.8155652+06	.1555747+07	.4841487+07
MOME 2	.2141471+07	.6796966+07	-.4622344+07	.8262927+07	-.3191469+06	-.7410315+07	.4841487+07	.1556555+08

SEGMENT SYMMETRY CHECK

.4521955+08	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1017529+09	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1555747+07	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1556555+08	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.4521955+08	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1017529+09	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1555747+07	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1556555+08

RZERO(I) = 7.100000+01 RZERO(J) = 7.100000+01

THE REDUCED STIFFNESS MATRIX

ROW	COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8
1	.1017529+09	-.7410315+07	.1913394+08	-.9261899+08	.5434273+06	.6796965+07	.0000000	.0000000
2	-.7410315+07	.1556555+08	-.2141471+07	.6796965+07	.4622344+07	.8262927+07	.0000000	.0000000
3	.1913394+08	-.2141471+07	.9043910+08	.0000000	.1775713+07	.0000000	-.2210817+08	.1215280+07
4	-.9261899+08	.6796965+07	.0000000	.2035057+09	.0000000	-.1482063+08	.1913394+08	.5434273+06
5	.5434273+06	.4622344+07	.1775713+07	.0000000	.3111493+07	.0000000	.1215280+07	-.1306077+07
6	.6796965+07	.8262927+07	.0000000	-.1482063+08	.0000000	.3113109+08	-.2141471+07	.4622344+07
7	.0000000	.0000000	-.2210817+08	.1913394+08	.1215280+07	-.2141471+07	.9043910+08	.1775713+07
8	.0000000	.0000000	.1215280+07	.5434273+06	-.1306077+07	.4622344+07	.1775713+07	.3111493+07
9	.0000000	.0000000	.2141471+07	.6796965+07	-.4622344+07	.8262927+07	.0000000	.0000000
10	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	-.2210817+08	.1215280+07
11	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	-.1913394+08	-.5434273+06
12	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.1215280+07	-.1306077+07
13	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.2141471+07	-.4622344+07
14	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
15	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000

ROW	COLUMN 9	COLUMN 10	COLUMN 11	COLUMN 12	COLUMN 13	COLUMN 14	COLUMN 15
1	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
2	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
3	.2141471+07	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
4	.6796965+07	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
5	-.4622344+07	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
6	.8262927+07	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
7	.0000000	-.2210817+08	-.1913394+08	.1215280+07	.2141471+07	.0000000	.0000000
8	.0000000	.1215280+07	-.5434273+06	-.1306077+07	-.4622344+07	.0000000	.0000000
9	.3113109+08	-.2141471+07	.6796965+07	.4622344+07	.8262927+07	.0000000	.0000000
10	-.2141471+07	.9043910+08	.0000000	.1775713+07	.0000000	-.1913394+08	.2141471+07
11	.6796965+07	.0000000	.2035057+09	.0000000	-.1482063+08	-.9261899+08	.6796965+07
12	.4622344+07	.1775713+07	.0000000	.3111493+07	.0000000	-.5434273+06	-.4622344+07
13	.8262927+07	.0000000	-.1482063+08	.0000000	.3113109+08	.6796965+07	.8262927+07
14	.0000000	-.1913394+08	-.9261899+08	-.5434273+06	.6796965+07	.1017529+09	-.7410315+07
15	.0000000	.2141471+07	.6796965+07	-.4622344+07	.8262927+07	-.7410315+07	.1556555+08

LIVE LOAD PRESTRESS STIFFNESS MATRIX

1	1.017529+08							
2	-7.410315+06	1.556555+07						
3	1.913394+07	-2.141471+06	9.043910+07					
4	-9.261899+07	6.796965+06	0.000000	2.035057+08				
5	5.434273+05	4.622344+06	1.775713+06	0.000000	3.111493+06			
6	6.796965+06	8.262927+06	0.000000	-1.482063+07	0.000000	3.113109+07		
7	0.000000	0.000000	-2.210817+07	1.913394+07	1.215280+06	-2.141471+06	9.043910+07	
8	0.000000	0.000000	1.215280+06	5.434273+05	-1.306077+06	4.622344+06	1.775713+06	3.111493+06
9	0.000000	0.000000	2.141471+06	6.796965+06	-4.622344+06	8.262927+06	0.000000	0.000000
	3.113109+07							
10	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	-2.210817+07	1.215280+06
	-2.141471+06	9.043910+07						
11	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	-1.913394+07	-5.434273+05
	6.796965+06	0.000000	2.035057+08					
12	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	1.215280+06	-1.306077+06
	4.622344+06	1.775713+06	0.000000	3.111493+06				
13	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	2.141471+06	-4.622344+06
	8.262927+06	0.000000	-1.482063+07	0.000000	3.113109+07			
14	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
	0.000000	-1.913394+07	-9.261899+07	-5.434273+05	6.796965+06	1.017529+08		
15	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
	0.000000	2.141471+06	6.796965+06	-4.622344+06	8.262927+06	-7.410315+06	1.556555+07	

```
DEAD LOAD PRESTRESS OR BASE STIFFNESS MATRIX
  1   1.017547+08
  2  -7.372812+06   1.727028+07
  3   1.913657+07  -2.091738+06   9.044680+07
  4  -9.262081+07   6.759837+06   0.000000      2.035094+08
  5   5.438035+05   4.880684+06   1.773242+06   0.000000      4.299166+06
  6   6.759837+06   7.821616+06   0.000000     -1.474562+07   0.000000      3.454056+07
  7   0.000000      0.000000     -2.210441+07   1.913657+07   1.217389+06  -2.091738+06   9.044680+07
  8   0.000000      0.000000      1.217389+06   5.438035+05  -1.899813+06   4.880684+06   1.773242+06   4.299166+06

  9   0.000000      0.000000      2.091738+06   6.759837+06  -4.880684+06   7.821616+06   0.000000      0.000000
      3.454056+07
 10   0.000000      0.000000      0.000000      0.000000      0.000000      0.000000     -2.210441+07   1.217389+06
     -2.091738+06   9.044680+07
 11   0.000000      0.000000      0.000000      0.000000      0.000000      0.000000     -1.913657+07  -5.438035+05
      6.759837+06   0.000000      2.035094+08
 12   0.000000      0.000000      0.000000      0.000000      0.000000      0.000000      1.217389+06  -1.899813+06
      4.880684+06   1.773242+06   0.000000      4.299166+06
 13   0.000000      0.000000      0.000000      0.000000      0.000000      0.000000      2.091738+06  -4.880684+06
      7.821616+06   0.000000     -1.474562+07   0.000000      3.454056+07
 14   0.000000      0.000000      0.000000      0.000000      0.000000      0.000000      0.000000      0.000000
      0.000000     -1.913657+07  -9.262081+07  -5.438035+05   6.759837+06   1.017547+08
 15   0.000000      0.000000      0.000000      0.000000      0.000000      0.000000      0.000000      0.000000
      0.000000      2.091738+06   6.759837+06  -4.880684+06   7.821616+06  -7.372812+06   1.727028+07


EIGENVALUES
   9.999748-01   1.149288+00   2.030215+00   3.922777+00   6.285919+00   1.051451+01   1.629792+01   1.985390+01
   5.257531+03   1.973684+04   7.709154+04   1.969181+05   2.234670+06   1.263621+07   1.114254+08

EIGENVECTOR   1
   4.884120-06  -2.016390-04  -6.247880-05   3.453593-06   9.076945-04  -1.425803-04  -8.835837-05   1.283674-03
  -5.528017-11  -6.247881-05  -3.453587-06   9.076949-04   1.425803-04  -4.884106-06   2.016391-04

EIGENVECTOR   2
   2.389588-05   1.897731-04   1.571040-05   1.069959-05  -6.019709-04  -9.771782-07   2.236211-11  -3.422666-10
  -1.866433-04  -1.571037-05   1.069959-05   6.019705-04  -9.772686-07   2.389589-05   1.897730-04

  THE CURRENT LOAD MULTIPLICATION FACTOR =   1.010235+00
```

REGION NUMBER 1

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1   SEGMENT CODE 31   SHUTTLE CYLINDER

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
1.0000000+00	0.0000000	-4.8841205-06	0.0000000	-2.01639-04	0.0000000	-2.3895882-05	0.0000000	1.89773-04
1.5500000+00	-7.6241216-06	-4.8658966-06	-1.1076356-04	-2.00887-04	2.6664595+06	-2.3661592-05	1.0369873-04	1.86420-04
2.0500000+00	-1.4507278-05	-4.8178152-06	-2.1076248-04	-1.98903-04	5.0288190-06	-2.3124847-05	1.9517741-04	1.78777-04
2.5500000+00	-2.1300990-05	-4.7400226-06	-3.0946213-04	-1.95693-04	7.2717892-06	-2.2292635-05	2.8177294-04	1.66921-04
3.0500000+00	-2.7963369-05	-4.6329996-06	-4.0625407-04	-1.91276-04	9.3400197-06	-2.1183946-05	3.6143753-04	1.51101-04
3.5500000+00	-3.4453338-05	-4.4974074-06	-5.0054158-04	-1.85680-04	1.1182806-05	-1.9823831-05	4.3226684-04	1.31641-04
4.0500000+00	-4.0730882-05	-4.3340839-06	-5.9174342-04	-1.78940-04	1.2755342-05	-1.8242980-05	4.9253878-04	1.08944-04
4.5500000+00	-4.6757296-05	-4.1440383-06	-6.7929731-04	-1.71096-04	1.4019864-05	-1.6477212-05	5.4074893-04	8.34772-05
5.0500000+00	-5.2495422-05	-3.9284449-06	-7.6266351-04	-1.62197-04	1.4946650+05	-1.4566876-05	5.7564180-04	5.57670-05
5.5500000+00	-5.7909879-05	-3.6886358-06	-8.4132803-04	-1.52299-04	1.5514868-05	-1.2556175-05	5.9623766-04	2.63884-05
6.0000000+00	-6.2478516-05	-3.4533249-06	-9.0770469-04	-1.42586-04	1.5710161-05	-1.0699788-05	6.0197955-04	-9.73132-07

REGION NUMBER 2

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 31 SHUTTLE CYLINDER

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
1.0000000+00	-6.2478796-05	-3.4535928-06	-9.0769450-04	-1.42580-04	1.5710402+05	-1.0699590-05	6.0197094-04	-9.77178-07
1.5500000+00	-6.7636844-05	-3.1427051-06	-9.8263084-04	-1.29746-04	1.5527613+05	-8.4692330-06	5.9223810-04	-3.42196-05
2.0500000+00	-7.1889110-05	-2.8396696-06	-1.0444081-03	-1.17236-04	1.4968947+05	-6.5621941-06	5.6784458-04	-6.30848-05
2.5500000+00	-7.5698154-05	-2.5191239-06	-1.0997463-03	-1.04003-04	1.4044831+05	-4.8174599-06	5.2947187-04	-9.00400-05
3.0500000+00	-7.9040492-05	-2.1830449-06	-1.1483043-03	-9.01292-05	1.2772793+05	-3.2771285-06	4.7821566-04	-1.14531-04
3.5500000+00	-8.1895515-05	-1.8335054-06	-1.1897829-03	-7.56996-05	1.1178745+05	-1.9787990-06	4.1543562-04	-1.36057-04
4.0500000+00	-8.4245619-05	-1.4726616-06	-1.2239261-03	-6.08033-05	9.2960079-06	-9.5491897-07	3.4272576-04	-1.54183-04
4.5500000+00	-8.6076317-05	-1.1027392-06	-1.2505236-03	-4.55321-05	7.1641745-06	-2.3221213-07	2.6188037-04	-1.68545-04
5.0500000+00	-8.7376317-05	-7.2602023-07	-1.2694114-03	-2.99803-05	4.8278535-06	1.6880526-07	1.7485629-04	-1.78857-04
5.5500000+00	-8.8137604-05	-3.4482867-07	-1.2804731-03	-1.42436-05	2.3353029-06	2.3421015-07	8.3732052-05	-1.84919-04
6.0000000+00	-8.8358212-05	1.2449662-10	-1.2836798-03	-2.63712-09	1.1745193-10	1.5551575-10	-3.4706867-09	-1.86646-04

REGION NUMBER 3

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1   SEGMENT CODE 31   SHUTTLE CYLINDER

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
1.0000000+00	-8.8358373-05	0.0000000	-1.2836741-03	-5.52802-11	2.2362108-11	0.0000000	3.4226661-10	-1.86643-04
1.5500000+00	-8.8028830-05	4.2143737-07	-1.2788865-03	1.73986-05	-2.8438048-06	2.4830101-07	-1.0218399-04	-1.84052-04
2.0500000+00	-8.7159286-05	8.0191255-07	-1.2662538-03	3.31064-05	-5.3091186-06	1.1503004-07	-1.9265809-04	-1.77128-04
2.5500000+00	-8.5752375-05	1.1774398-06	-1.2458142-03	4.86101-05	-7.6083181-06	-3.5160690-07	-2.7860903-04	-1.65988-04
3.0500000+00	-8.3816773-05	1.5457039-06	-1.2176937-03	6.38142-05	-9.6937619-06	-1.1363450-06	-3.5797924-04	-1.50849-04
3.5500000+00	-8.1364414-05	1.9044348-06	-1.1820656-03	7.86249-05	-1.1521738-05	-2.2173953-06	-4.2884121-04	-1.32012-04
4.0500000+00	-7.8410418-05	2.2514212-06	-1.1391496-03	9.29509-05	-1.3053811-05	-3.5668505-06	-4.8943776-04	-1.09857-04
4.5500000+00	-7.4972998-05	2.5845245-06	-1.0892103-03	1.06704-04	-1.4258056-05	-5.1511869-06	-5.3821917-04	-8.48318-05
5.0500000+00	-7.1073347-05	2.9016919-06	-1.0325555-03	1.19799-04	-1.5110161-05	-6.9318540-06	-5.7387628-04	-5.74493-05
5.5500000+00	-6.6735512-05	3.2009688-06	-9.6953443-04	1.32156-04	-1.5594379-05	-8.8659408-06	-5.9536928-04	-2.82731-05
6.0000000+00	-6.2478861-05	3.4534950-06	-9.0769274-04	1.42582-04	-1.5710133-05	-1.0699391-05	-6.0197904-04	-9.81295-07

REGION NUMBER 4

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 31 SHUTTLE CYLINDER

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
1.0000000+00	-6.2478809-05	3.4535873-06	-9.0769486-04	1.42580-04	-1.5710371-05	-1.0699589-05	-6.0197052-04	-9.77269-07
1.5500000+00	-5.6854718-05	3.7387018-06	-8.2598782-04	1.54351-04	-1.5430732-05	-1.2963916-05	-5.9329258-04	3.23649-05
2.0500000+00	-5.1372729-05	3.9737394-06	-7.4634518-04	1.64055-04	-1.4789536-05	-1.4958260-05	-5.6977468-04	6.14583-05
2.5500000+00	-4.5574012-05	4.1842694-06	-6.6210095-04	1.72748-04	-1.3793205-05	-1.6843135-05	-5.3213227-04	8.87650-05
3.0500000+00	-3.9494319-05	4.3689946-06	-5.7377447-04	1.80376-04	-1.2464408-05	-1.8575050-05	-4.8140208-04	1.13719-04
3.5500000+00	-3.3171137-05	4.5267774-06	-4.8191023-04	1.86892-04	-1.0834546-05	-2.0114509-05	-4.1889162-04	1.35805-04
4.0500000+00	-2.6643451-05	4.6566468-06	-3.8707456-04	1.92256-04	-8.9428767-06	-2.1426670-05	-3.4615149-04	1.54567-04
4.5500000+00	-1.9951508-05	4.7578040-06	-2.8985211-04	1.96434-04	-6.8354807-06	-2.2481929-05	-2.6494317-04	1.69619-04
5.0500000+00	-1.3136570-05	4.8296279-06	-1.9084225-04	1.99402-04	-4.5640944-06	-2.3256415-05	-1.7720286-04	1.80650-04
5.5500000+00	-6.2406559-06	4.8716784-06	-9.0655394-05	2.01140-04	-2.1848325-06	-2.3732386-05	-8.5002198-05	1.87430-04
6.0000000+00	-2.3431236-10	4.8838518-06	8.6994684-09	2.01644-04	-9.2916407-11	-2.3896040-05	3.7345224-09	1.89776-04

The third test problem involves the investigation of vibration frequency characteristics of a prestressed spherical cap as shown in Figure 4-3. In this problem five harmonics are searched (n = 0-4) and thus three sets of boundary conditions are utilized. The input is set so that the two lowest eigenvectors are investigated in each harmonic. No intermediate print is required. The prestress load is a uniform external pressure of p = 1466 psi. It is interesting to note in this problem that the prestress pressure is rather close to the buckling load for the n=2 harmonic. The buckling load of a shell can be found using a vibrations analysis, by finding the loading which will cause a zero frequency. Further analytical discussions and comparisons for this problem are available in Reference 1.

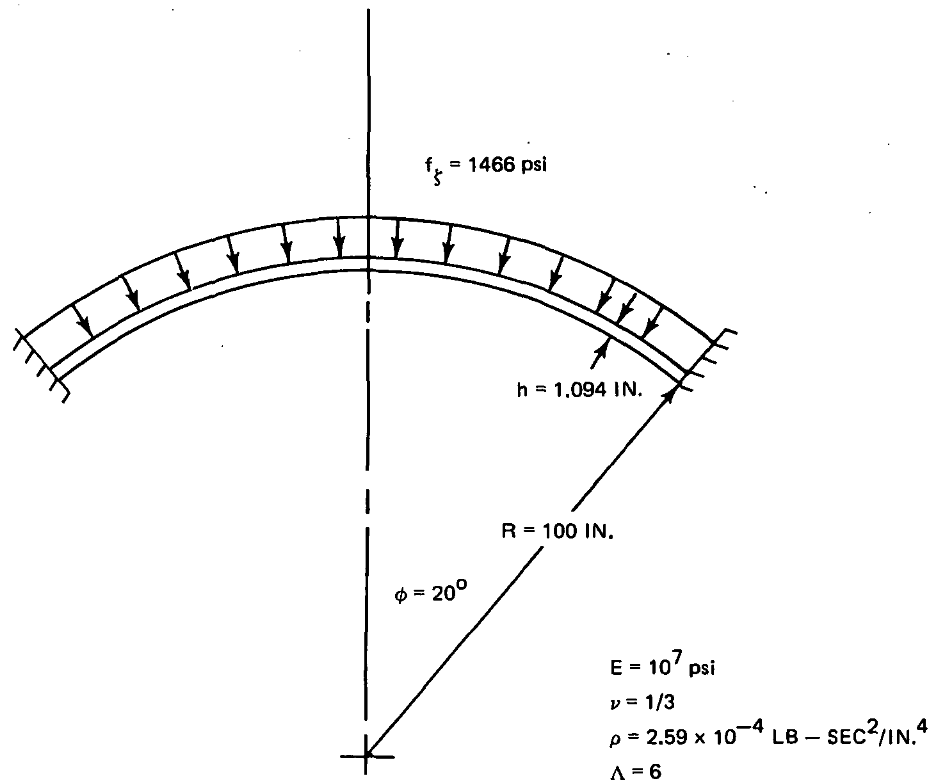


Figure 4-3 Test Problem 3

```
 PRESTRESSED  VIBRATIØNS  SPHERICAL  CAP
8  8 1 0 4 1 1 3   0 0                                        2785.976
VPRE
ALUM      ISØT

 1.0      E 07

 .333333

------------------------------------------------------------------------------------
 1 0 0  REGIØN 1
   1    1    2
11 SPHERE
  .001         1.0       E-04   .0001                                      0.
 100.          1.0
ISØT      ALUM      SING      THIC      NØTH      0.0                      2
  .01          .02
 1.094         1.094
 2.59      E-04 2.59      E-04
000100
  1466.         1466.
    1    1    2
------------------------------------------------------------------------------------
 1 0 0  REGIØN 2
   2    2    3
11 SPHERE
  .002         1.0       E-04   .0002
 100.          1.0
ISØT      ALUM      SING      THIC      NØTH      0.0                      2
  .02          .04
 1.094         1.094
 2.59      E-04 2.59      E-04
000100
  1466.         1466.
    1    1    2
------------------------------------------------------------------------------------
 1 0 0  REGIØN 3
   3    3    4
11 SPHERE
  .002         1.0       E-04   .0002
 100.          1.0
ISØT      ALUM      SING      THIC      NØTH      0.0                      2
  .04          .06
 1.094         1.094
 2.59      E-04 2.59      E-04
000100
  1466.         1466.
    1    1    2
------------------------------------------------------------------------------------
 1 0 0  REGIØN 4
```

```
    4     4     5
11 SPHERE
  .003          1.0       E-04    .0003
 100.           1.0
ISØT      ALUM        SING        THIC      NØTH      0.0                 2
  .06           .09
 1.094          1.094
 2.59      E-04 2.59      E-04
000100
  1466.          1466.
    1    1    2
------------------------------------------------------------------------
 1 0 0  REGIØN 5
    5    5    6
11 SPHERE
 .003907        1.0       E-04    .0003907
 100.           1.0
ISØT      ALUM        SING        THIC      NØTH      0.0                 2
  .09           .12907
 1.094          1.094
 2.59      E-04 2.59      E-04
000100
  1466.          1466.
    1    1    2
------------------------------------------------------------------------
 1 0 0  REGIØN 6
    6    6    7
11 SPHERE
 .005           1.0       E-04    .0005
100.            1.0
ISØT      ALUM        SING        THIC      NØTH      0.0                 2
  .12907        .17907
 1.094          1.094
 2.59      E-04 2.59      E-04
000100
  1466.          1466.
    1    1    2
------------------------------------------------------------------------
 1 0 0  REGIØN 7
    7    7    8
11 SPHERE
  .007          1.0       E-04    .0007
 100.           1.0
ISØT      ALUM        SING        THIC      NØTH      0.0                 2
  .17907        .24907
 1.094          1.094
 2.59      E-04 2.59      E-04
000100
  1466.          1466.
    1    1    2
------------------------------------------------------------------------
 1 0 0  REGIØN 8
    8    8    9
11 SPHERE
  .01           1.0       E-04    .001
 100.           1.0
ISØT      ALUM        SING        THIC      NØTH      0.0                 2
  .24907        .34907
 1.094          1.094
 2.59      E-04 2.59      E-04
000100
```

```
 1466.      1466.
   1    1    2
------------------------------------------------------------------
   9    0    0
1 0 1 0 0
2 0 1 1 1
3 0 1 1 1
4 0 1 1 1
5 0 1 1 1
6 0 1 1 1
7 0 1 1 1
8 0 1 1 1
9 0 0 0 0
------------------------------------------------------------------

------------------------------------------------------------------
1 1 2 0 1  .01
2 1 1 1 1
3 1 1 1 1
4 1 1 1 1
5 1 1 1 1
6 1 1 1 1
7 1 1 1 1
8 1 1 1 1
9 0 0 0 0
------------------------------------------------------------------
1 0 0 0 0
2 1 1 1 1
3 1 1 1 1
4 1 1 1 1
5 1 1 1 1
6 1 1 1 1
7 1 1 1 1
8 1 1 1 1
9 0 0 0 0
------------------------------------------------------------------
FIN
```

UNSYMMETRIC, ORTHOTROPIC, REINFORCED SHELL ANALYSIS WITH COUPLING OF AT MOST 29 SHELL REGIONS

STARS-2V

AS OF NOVEMBER 1, 1972

NUMBER OF SEGMENTS = 8 NUMBER OF REGIONS = 8 NUMBER OF MATERIAL PROPERTY TABLES USED = 1 NUMBER OF PROBLEMS = 1

NUMBER OF BOUNDARY CONDITION MATRICES = 3

VIBRATION HARMONICS (N) = 0 TO 4 INCREMENTED BY 1

PRESTRESSED VIBRATION PROBLEM

PRESTRESSED VIBRATIONS SPHERICAL CAP

FOR INFORMATION CALL V. SVALBONAS (516) 575-7701

P. OGILVIE

REGION NUMBER 1

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 SPHERE

DTAU	DIFF	STEP	DELTA
.1000000-02	.1000000-03	.1000000-03	.0000000

GEOMETRY INPUT VARIABLES

.1000000+03	.1000000+01	.0000000

ISOT ALUM SING THIC NOTH T FREE = .000 NUMBER OF TABLE COLUMNS = 2

MATERIAL PROPERTY TABLE USED

.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.10000+08	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.33333+00	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000

TABLE ORDER PHI OR S VS. CROSSECTION PROPERTIES

.1000000-01	.2000000+01
.1094000+01	.1094000+01
.2590000-03	.2590000-03

PROBLEM 1 TABLE ORDER PHI OR S VS. DISTRIBUTED LOADS (F THETA, F PHI, F ZETA, M THETA, M PHI)
LOAD IDENTIFICATION CLUES 000100

.1466000+04	.1466000+04

MATRIX X AND Y (TRANSPOSED) MAGIC OUTPUT

.9370650-34	.0000000	.0000000	.0000000	.1999900+01	.0000000	.0000000	.0000000
.0000000	.4101800+07	-.8204694+05	-.3967855+05	.0000000	.9999375+00	-.6770681-02	.1088863-01
.0000000	-.4101937+05	.8204968+03	.3967987+03	.0000000	.9999958-02	.9999177+00	-.1088899-03
.0000000	-.2185522+05	.4371626+03	-.4089801+06	.0000000	.5328001-02	.9620734+00	.9999662+00
.2500250+00	.0000000	.0000000	.0000000	.1828121-06	.0000000	.0000000	.0000000
.0000000	.7499563+00	-.9999958-02	-.4836058-02	.0000000	.6093756-07	.1958533-10	.1327116-08
.0000000	.7104035-02	.4999579+00	.5870960+00	.0000000	-.4209256-10	-.9405552-07	-.2591050-06
.0000000	.5443770-02	-.1088899-03	.7499761+00	.0000000	-.1327116-08	-.3286547-06	-.6109999-06
.0000000	-.5712305+01	-.1399496+04	-.9317247+03	.0000000	-.4922544-07	.3019380-04	.1459165-03

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.6873469+08	.0000000	.0000000	.0000000	-.3436906+08	.0000000	.0000000	.0000000
FORCZ1	.0000000	.1409920+09	.5530093+06	-.5980605+08	.0000000	-.1409920+09	-.1824608+06	-.7583162+08
FORCR1	.0000000	.5530093+06	.1031116+09	-.7839270+06	.0000000	-.5530093+06	-.1031085+09	-.1182675+07
MOME 1	.0000000	-.5980605+08	-.7839270+06	.3565500+08	.0000000	.5980605+08	.7387132+06	.2188869+08
FORCT2	-.3436906+08	.0000000	.0000000	.0000000	.1718539+08	.0000000	.0000000	.0000000
FORCZ2	.0000000	-.1409920+09	-.5530093+06	.5980605+08	.0000000	.1409920+09	.1824608+06	.7583162+08
FORCR2	.0000000	-.1824608+06	-.1031085+09	.7387132+06	.0000000	.1824608+06	.1546609+09	.1314014+07
MOME 2	.0000000	-.7583162+08	-.1182675+07	.2188869+08	.0000000	.7583162+08	.1314014+07	.5621963+08

SEGMENT SYMMETRY CHECK

.6873469+08	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1409920+09	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1031116+09	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.3565500+08	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1718539+08	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1409920+09	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1546609+09	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.5621962+08

SEGMENT LOAD MATRICES

.0000000
.5681129+04
.6762359+02
-.9096147+03
.0000000
.8133293+04
.1455094+03

```
.1374748+04
RZERO(I) =     9.999833-01          RZERO(J) =     1.999867+00
```

REGION NUMBER 2

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 SPHERE

DIAU	DIFF	STEP	DELTA
.2000000-02	.1000000-03	.2000000-03	.0000000

GEOMETRY INPUT VARIABLES

.1000000+03	.1000000+01	.0000000

ISOT ALUM SING THIC NOTH T FREE = .000 NUMBER OF TABLE COLUMNS = 2

MATERIAL PROPERTY TABLE USED

.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.10000+08	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.33333+00	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000

TABLE ORDER PHI OR S VS. CROSSECTION PROPERTIES

.2000000-01	.4000000-01
.1094000+01	.1094000+01
.2590000-03	.2590000-03

PROBLEM 1 TABLE ORDER PHI OR S VS. DISTRIBUTED LOADS (F THETA, F PHI, F ZETA, M THETA, M BHI)

LOAD IDENTIFICATION CLUES 000100

.1466000+04	.1466000+04

MATRIX X AND Y (TRANSPOSED) MAGIC OUTPUT

.4438298-34	.0000000	.0000000	.0000000	.1999600+01	.0000000	.0000000	.0000000
.0000000	.2049674+07	-.8203070+05	-.7934916+05	.0000000	.9998355+00	.3558527-02	.4355145-01
.0000000	-.4099894+05	.1640833+04	.1587195+04	.0000000	.1999796-01	.9993288+00	-.8711451-03
.0000000	-.4369241+06	.1748629+04	-.2033728+06	.0000000	.2131174-01	.1923858+01	.9995249+00
.2501000+00	.0000000	.0000000	.0000000	.3656159-06	.0000000	.0000000	.0000000
.0000000	.7497823+00	-.1999796-01	-.1934423-01	.0000000	.1218907-06	.4246923-08	.1061724-07
.0000000	.2160288-01	.4995357+00	.1174061+01	.0000000	-.3775676-08	-.7588432-08	-.1036743-05
.0000000	.2176701-01	-.8711451-03	.7495842+00	.0000000	-.1061724-07	-.1314569-05	-.1221920-05
.0000000	-.2758830+02	-.2198776+04	-.2126849+04	.0000000	.1917643-05	.6111105-03	.1167366-02

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.6872251+08	.0000000	.0000000	.0000000	-.3436813+08	.0000000	.0000000	.0000000
FORCZ1	.0000000	.3531561+08	-.1904431+07	-.2990268+08	.0000000	-.3531561+08	.2725545+07	-.3788163+08
FORCR1	.0000000	-.1904431+07	.1030380+09	-.5803432+06	.0000000	.1904431+07	-.1030216+09	-.1489849+07
MOME 1	.0000000	-.2990268+08	-.5803432+06	.3565421+08	.0000000	.2990268+08	.3314775+06	.2188259+08
FORCT2	-.3436813+08	.0000000	.0000000	.0000000	.1718750+08	.0000000	.0000000	.0000000
FORCZ2	.0000000	-.3531561+08	.1904431+07	.2990268+08	.0000000	.3531561+08	-.2725545+07	.3788163+08
FORCR2	.0000000	.2725545+07	-.1030216+09	.3314775+06	.0000000	-.2725545+07	.1545653+09	.1928929+07
MOME 2	.0000000	-.3788163+08	-.1489849+07	.2188259+08	.0000000	.3788163+08	.1928929+07	.5621424+08

SEGMENT SYMMETRY CHECK

.6872250+08	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.3531561+08	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1030380+09	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.3565421+08	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1718750+08	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.3531561+08	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1545653+09	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.5621424+08

SEGMENT LOAD MATRICES

.0000000
.2271594+05
.5820002+03
-.7276020+04
.0000000
.3251413+05
.1081478+04

```
.1099563+05
RZERO(I) =   1.999867+00          RZERO(J) =   3.998933+00
```

REGION NUMBER 3

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1   SEGMENT CODE 11   SPHERE

DTAU	DIFF	STEP	DELTA
.2000000-02	.1000000-03	.2000000-03	.0000000

GEOMETRY INPUT VARIABLES

.1000000+03	.1000000+01	.0000000

ISOT   ALUM   SING   THIC   NOTH   T FREE = .000   NUMBER OF TABLE COLUMNS = 2

MATERIAL PROPERTY TABLE USED

.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.10000+08	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.33333+00	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000

TABLE ORDER PHI OR S VS. CROSSECTION PROPERTIES

.4000000-01	.4000000-01
.1094000+01	.1094000+01
.2590000-03	.2590000-03

PROBLEM 1   TABLE ORDER PHI OR S VS. DISTRIBUTED LOADS (F THETA, F PHI, F ZETA, M THETA, M BHI)

LOAD IDENTIFICATION CLUES 000100

.1466000+04	.1466000+04

MATRIX X AND Y (TRANSPOSED) MAGIC OUTPUT

.1347620-34	.0000000	.0000000	.0000000	.1499500+01	.0000000	.0000000	.0000000
.0000080	.7583761+06	-.4555725+05	-.4466473+05	.0000000	.9442625+00	-.6470694-02	.2454704-01
.0000000	-.3035123+05	.1823262+04	.1787543+04	.0000000	.2222135-01	-.9992586+00	-.9824056-03
.0000000	-.3125133+05	.1877333+04	-.7443807+05	.0000000	.2288035-01	.1914242+01	.9439508+00
.4447409+00	.0000000	.0000000	.0000000	.4062662-06	.0000000	.0000000	.0000000
.0000000	.8146522+00	-.2222135-01	-.2178601-01	.0000000	.1354434-06	.4754800-08	.1197325-07
.0000000	.2229499-01	.6662175+00	.1451621+01	.0000000	-.4448639-08	-.8833139-06	-.1248394-05
.0000000	.1635377-01	-.9824056-03	.8144117+00	.0000000	-.1197325-07	-.1430773-05	-.1357775-05
.0000000	-.2873302+02	-.2443238+04	-.2395372+04	.0000000	.2185410-05	.6796952-03	.1316459-02

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.9273845+08	.0000000	.0000000	.0000000	-.6184625+08	.0000000	.0000000	.0000000
FORCZ1	.0000000	.5846802+08	-.5979072+07	-.5342174+08	.0000000	-.5846802+08	.7296397+07	-.6113468+08
FORCR1	.0000000	-.5979072+07	.1749112+09	-.2026779+07	.0000000	.5979072+07	-.1851821+09	-.3778863+07
MOME 1	.0000000	-.5342174+08	-.2026779+07	.6662047+08	.0000000	.5342174+08	.1739762+07	.3781012+08
FORCT2	-.6184625+08	.0000000	.0000000	.0000000	.4124458+08	.0000000	.0000000	.0000000
FORCZ2	.0000000	-.5846802+08	.5979072+07	.5342174+08	.0000000	.5846802+08	-.7296397+07	.6113468+08
FORCR2	.0000000	.7296397+07	-.1851821+09	.1739762+07	.0000000	-.7296397+07	.2263973+09	.4179407+07
MOME 2	.0000000	-.6113468+08	-.3778863+07	.3781012+08	.0000000	.6113468+08	.4179407+07	.8716404+08

SEGMENT SYMMETRY CHECK

.9273845+08	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.5846801+08	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1749112+09	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.6662047+08	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.4124458+08	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.5846801+08	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.2263973+09-	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.8716404+08

SEGMENT LOAD MATRICES

.0000000
.4108620+05
.1888593+04
-.1345622+05
.0000000
.5086572+05
.2719307+04

.1714872+05

RZERO(I) = 3.998933+00 RZERO(J) = 5.996401+00

REGION NUMBER 4

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 SPHERE

DTAU	DIFF	STEP	DELTA
.3000000-02	.1000000-03	.3000000-03	.0000000

GEOMETRY INPUT VARIABLES

.1000000+03	.1000000+01	.0000000

ISOT ALUM SING THIC NOTH T FREE = .000 NUMBER OF TABLE COLUMNS = 2

MATERIAL PROPERTY TABLE USED

.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.10000+08	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.33333+00	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000

TABLE ORDER PHI OR S VS. CROSSECTION PROPERTIES

.6000000-01	.9000000-01
.1094000+01	.1094000+01
.2590000-03	.2590000-03

PROBLEM 1 TABLE ORDER PHI OR S VS. DISTRIBUTED LOADS (F THETA, F PHI, F ZETA, M THETA, M PHI)

LOAD IDENTIFICATION CLUES 000100

.1466000+04	.1466000+04

MATRIX X AND Y (TRANSPOSED) MAGIC OUTPUT

.1285905-34	.0000000	.0000000	.0000000	.1498075+01	.0000000	.0000000	.0000000
.0000000	.5042961+06	-.4550959+05	-.6695187+05	.0000000	.9442184+00	.1403418-01	.5519895-01
.0000000	-.3029413+05	.2733857+04	.4021940+04	.0000000	.3331939-01	.9769051+00	-.3315917-02
.0000000	-.4680431+05	.4223799+04	-.4622263+05	.0000000	.5147834-01	.2869877+01	.9419277+00
.4451119+00	.0000000	.0000000	.0000000	.6094256-06	.0000000	.0000000	.0000000
.0000000	.8143272+00	-.3331939-01	-.4901814-01	.0000000	.2033453-06	.2808685-07	.4041336-07
.0000000	.4799244-01	.6643418+00	.2176664+01	.0000000	-.2602710-07	-.2981301-05	-.2808931-05
.0000000	.3674399-01	-.3315917-02	.8125424+00	.0000000	-.4041336-07	-.3218900-05	-.2036003-05
.0000000	-.7806392+02	-.3663468+04	-.5389546+04	.0000000	.2213799-04	.3441203-02	.4443450-02

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.9266490+08	.0000000	.0000000	.0000000	-.6182297+08	.0000000	.0000000	.0000000
FORCZ1	.0000000	.2675168+08	-.1131534+08	-.3564887+08	.0000000	-.2675168+08	.1330252+08	-.4054341+08
FORCR1	.0000000	-.1131534+08	.1742598+09	-.1276193+07	.0000000	.1131534+08	-.1844732+09	-.4729030+07
MOME 1	.0000000	-.3564887+08	-.1276193+07	.6661267+08	.0000000	.3564887+08	.6125131+06	.3776580+08
FORCT2	-.6182297+08	.0000000	.0000000	.0000000	.4124625+08	.0000000	.0000000	.0000000
FORCZ2	.0000000	-.2675168+08	.1131534+08	.3564887+08	.0000000	.2675168+08	-.1330252+08	.4054341+08
FORCR2	.0000000	.1330252+08	-.1844732+09	.6125131+06	.0000000	-.1330252+08	.2256426+09	.5609349+07
MOME 2	.0000000	-.4054341+08	-.4729030+07	.3776580+08	.0000000	.4054341+08	.5609349+07	.8713521+08

SEGMENT SYMMETRY CHECK

.9266490+08	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.2675168+08	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1742598+09	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.6661267+08	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.4124625+08	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.2675168+08	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.2256426+09	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.8713521+08

SEGMENT LOAD MATRICES

.0000000
.9223511+05
.6828066+04
-.4538510+05
.0000000
.1142085+06
.8475157+04

.5782475+05

RZERO(I) =   5.996401+00   RZERO(J) =   8.987855+00

REGION NUMBER 5

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 SPHERE

DIAU	DIFF	STEP	DELTA
.3907000-03	.1000000-03	.3907000-03	.0000000

GEOMETRY INPUT VARIABLES

.1000000+03	.1000000+01	.0000000

ISOT ALUM SING THIC NOTH T FREE = .000 NUMBER OF TABLE COLUMNS = 2

MATERIAL PROPERTY TABLE USED

.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.10000+08	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.33333+00	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000

TABLE ORDER PHI OR S VS. CROSSECTION PROPERTIES

.9000000-01	.1290700+00
.1094000+01	.1094000+01
.2590000-03	.2590000-03

PROBLEM 1 TABLE ORDER PHI OR S VS. DISTRIBUTED LOADS (F THETA, F PHI, F ZETA, M THETA, M PHI)

LOAD IDENTIFICATION CLUES 000100

.1466000+04	.1466000+04

MATRIX X AND Y (TRANSPOSED) MAGIC OUTPUT

.7742145-35	.0000000	.0000000	.0000000	.1432065+01	.0000000	.0000000	.0000000
.0000000	.3092736+06	-.4014110+05	-.7713092+05	.0000000	.9428379+00	.4580579-01	.8280111-01
.0000000	-.2791002+05	.3622485+04	.6960587+04	.0000000	.4414971-01	.9915782+00	-.7472286-02
.0000000	-.5597020+05	.7264458+04	-.2165265+05	.0000000	.8853694-01	.3741495+01	.9355569+00
.4876121+00	.0000000	.0000000	.0000000	.8083668-06	.0000000	.0000000	.0000000
.0000000	.8277707+00	-.4414971-01	-.8483346-01	.0000000	.2702920-06	.8607387-07	.9106989-07
.0000000	.8320332-01	.6905004+00	.2930397+01	.0000000	-.8027995-07	-.6741000-05	-.4904993-05
.0000000	.5757144-01	-.7472286-02	.8219230+00	.0000000	-.9106989-07	-.5534121-05	-.2697984-05
.0000000	-.1575810+03	-.4054262+04	-.9327441+04	.0000000	.9164944-04	.1007104-01	.1001314-01

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.1000438+09	.0000000	.0000000	.0000000	-.6985982+08	.0000000	.0000000	.0000000
FORCZ1	.0000000	.1939430+08	-.1994608+08	-.3112794+08	.0000000	-.1939430+08	.2283033+08	-.3427173+08
FORCR1	.0000000	-.1994608+08	.1952750+09	-.6776401+06	.0000000	.1994608+08	-.2070447+09	-.7072369+07
MOME 1	.0000000	-.3112794+08	-.6776401+06	.7598372+08	.0000000	.3112794+08	-.4769750+06	.4241267+08
FORCT2	-.6985982+08	.0000000	.0000000	.0000000	.4878257+08	.0000000	.0000000	.0000000
FORCZ2	.0000000	-.1939430+08	.1994608+08	.3112794+08	.0000000	.1939430+08	-.2283033+08	.3427173+08
FORCR2	.0000000	.2283033+08	-.2070447+09	-.4769751+06	.0000000	-.2283033+08	.2464384+09	.8534512+07
MOME 2	.0000000	-.3427173+08	-.7072369+07	.4241267+08	.0000000	.3427173+08	.8534512+07	.9646722+08

SEGMENT SYMMETRY CHECK

.1000438+09	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1939430+08	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1952750+09	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.7598372+08	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.4878257+08	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1939430+08	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.2464384+09	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.9646722+08

SEGMENT LOAD MATRICES

.0000000
.1767619+06
.2069206+05
-.1140086+06
.0000000
.2141873+06
.2120272+05

.1413626+06

RZERO(I) =   8.987855+03   RZERO(J) =   1.287119+01

REGION NUMBER 6

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1   SEGMENT CODE 11   SPHERE

DIAU	DIFF	STEP	DELTA
.5000000-02	.1000000-03	.5000000-03	.0000000

GEOMETRY INPUT VARIABLES

.1000000+03	.1000000+01	.0000000

ISOT   ALUM   SING   THIC   NOTH   T FREE =   .000   NUMBER OF TABLE COLUMNS = 2

MATERIAL PROPERTY TABLE USED

.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.10000+00	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.33333+00	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000

TABLE ORDER PHI OR S VS. CROSSECTION PROPERTIES

.1290700+00	.1790700+00
.1094000+01	.1094000+01
.2590000-03	.2590000-03

PROBLEM 1   TABLE ORDER PHI OR S VS. DISTRIBUTED LOADS (F THETA, F PHI, F ZETA, M THETA, M PHI)

LOAD IDENTIFICATION CLUES 000100

.1466000+04	.1466000+04

MATRIX X AND Y (TRANSPOSED) MAGIC OUTPUT

.6497646-35	.0000000	.0000000	.0000000	.1383823+01	.0000000	.0000000	.0000000
.0000000	.1995489+06	-.3612012+05	-.8914023+05	.0000000	.9436021+00	.1092684+00	.1224795+00
.0000000	-.2689976+05	.4688086+04	.1156965+05	.0000000	.5713693-01	.9780813+00	-.1589680-01
.0000000	-.6640910+05	.1202064+05	-.3381341+03	.0000000	.1465038+00	.4784619+01	.9230120+00
.5222025+00	.0000000	.0000000	.0000000	.1049085-06	.0000000	.0000000	.0000000
.0000000	.8378607+00	-.5713693-01	-.1410072+00	.0000000	.3527289-06	.2397179-06	.1937452-06
.0000000	.1441985+00	.7021690+00	.3836725+01	.0000000	-.2248547-06	-.1437236-04	-.8204948-05
.0000000	.8782330-01	-.1589680-01	.8209571+00	.0000000	-.1937452-06	-.9150665-05	-.3492011-05
.0000000	-.3159336+03	-.6282207+04	-.1550375+05	.0000000	.3331584-03	.2736196-01	.2130229-01

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.1066764+09	.0000000	.0000000	.0000000	-.7708818+08	.0000000	.0000000	.0000000
FORCZ1	.0000000	.1667243+08	-.3186495+08	-.2733917+08	.0000000	-.1667243+08	.3588915+08	-.2836397+08
FORCR1	.0000000	-.3186495+08	.2127581+09	.8312495+06	.0000000	.3186495+08	-.2255376+09	-.1047402+08
MOME 1	.0000000	-.2733917+08	.8312495+06	.8458655+08	.0000000	.2733917+08	-.2750954+07	.4647276+08
FORCT2	-.7708818+08	.0000000	.0000000	.0000000	.5570668+08	.0000000	.0000000	.0000000
FORCZ2	.0000000	-.1667243+08	.3186495+08	.2733917+08	.0000000	.1667243+08	-.3588915+08	.2836397+08
FORCR2	.0000000	.3588915+08	-.2255376+09	-.2750954+07	.0000000	-.3588915+08	.2634761+09	.1283353+08
MOME 2	.0000000	-.2836397+08	-.1047402+08	.4647276+08	.0000000	.2836397+08	.1283353+08	.1050178+09

SEGMENT SYMMETRY CHECK

.1066764+09	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1667243+08	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.2127581+09	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.8458655+08	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.5570668+08	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1667243+08	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.2634761+09	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1050178+09

SEGMENT LOAD MATRICES

.0000000
.3174748+06
.5772409+05
-.2647674+06
.0000000
.3806392+06
.4631640+05

```
.3216499+06
RZERO(I) =     1.287119+01          RZERO(J) =     1.781145+01
```

REGION NUMBER 7

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1   SEGMENT CODE 11   SPHERE

DIAU	DIFF	STEP	DELTA
.7000000-02	.1000000-03	.7000000-03	.0000000

GEOMETRY INPUT VARIABLES

.1000000+03	.1000000+01	.0000000

ISOT   ALUM   SING   THIC   NOTH   T FREE = .000   NUMBER OF TABLE COLUMNS = 2

MATERIAL PROPERTY TABLE USED

.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.10000+08	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.33333+00	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000

TABLE ORDER PHI OR S VS. CROSSECTION PROPERTIES

.1790700+00	.2490700+00
.1094000+01	.1094000+01
.2590000-03	.2590000-03

PROBLEM 1   TABLE ORDER PHI OR S VS. DISTRIBUTED LOADS (F THETA, F PHI, F ZETA, M THETA, M PHI)

LOAD IDENTIFICATION CLUES 000100

.1466000+04	.1466000+04

MATRIX X AND Y (TRANSPOSED) MAGIC OUTPUT

.3165288-35	.0000000	.0000000	.0000000	.1383957+01	.0000000	.0000000	.0000000
.0000000	.1406307+06	-.3576964+05	-.1247011+06	.0000000	.9480074+00	.3655869+00	.2404955+00
.0000000	-.2545541+05	.6474822+04	.2257200+05	.0000000	.7891067-01	.9187162+00	-.4353183-01
.0000000	-.9221775+05	.2345573+05	.3958315+05	.0000000	.2858711+00	.6613357+01	.8659713+00
.5221017+00	.0000000	.0000000	.0000000	.1467785-05	.0000000	.0000000	.0000000
.0000000	.8323442+00	-.7891067-01	-.2751005+00	.0000000	.5060612-06	.9369387-06	.5305523-06
.0000000	.3423756+00	.6465672+00	.5291487+01	.0000000	-.8780784-06	-.3934081-04	-.1600106-04
.0000000	.1711483+00	-.4353183-01	.7649703+00	.0000000	-.5305523-06	-.1785148-04	-.4824062-05
.0000000	-.9107878+03	-.8876231+04	-.3024731+05	.0000000	.1046542-02	.1049854+00	.5833424-01

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.1055211+09	.0000000	.0000000	.0000000	-.7624593+08	.0000000	.0000000	.0000000
FORCZ1	.0000000	.1594132+08	-.4403627+08	-.2093643+08	.0000000	-.1594132+08	.4954266+08	-.1769133+08
FORCR1	.0000000	-.4403627+08	.2049278+09	.5289206+07	.0000000	.4403627+08	-.2170131+09	-.1570358+08
MOME 1	.0000000	-.2093643+08	.5289206+07	.8431633+08	.0000000	.2093643+08	-.9035864+07	.4517416+08
FORCT2	-.7624593+08	.0000000	.0000000	.0000000	.5509272+08	.0000000	.0000000	.0000000
FORCZ2	.0000000	-.1594132+08	.4403627+08	.2093643+08	.0000000	.1594132+08	-.4954266+08	.1769133+08
FORCR2	.0000000	.4954266+08	-.2170131+09	-.9035864+07	.0000000	-.4954266+08	.2544342+09	.2028319+08
MOME 2	.0000000	-.1769133+08	-.1570358+08	.4517416+08	.0000000	.1769133+08	.2028319+08	.1048268+09

SEGMENT SYMMETRY CHECK

.1055211+09	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1594132+08	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.2049278+09	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.8431633+08	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.5509272+08	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1594132+08	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.2544342+09	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1048268+09

SEGMENT LOAD MATRICES

.0000000
.5962563+06
.1888400+06
-.7131486+06
.0000000
.7411488+06
.7605456+05

.8664672+06

RZERO(I) = 1.781145+01 RZERO(J) = 2.465028+01

REGION NUMBER 8

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 SPHERE

DIAU	DIFF	STEP	DELTA
.1000000-01	.1000000-03	.1000000-02	.0000000

GEOMETRY INPUT VARIABLES

.1000000+03	.1000000+01	.0000000

ISOT ALUM SING THIC NOTH T FREE = .000 NUMBER OF TABLE COLUMNS = 2

MATERIAL PROPERTY TABLE USED

.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.10000+08	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.33333+00	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000

TABLE ORDER PHI OR S VS. CROSSECTION PROPERTIES

.2490700+00	.3490700+00
.1094000+01	.1094000+01
.2590000-03	.2590080-03

PROBLEM 1 TABLE ORDER PHI OR S VS. DISTRIBUTED LOADS (F THETA, F PHI, F ZETA, M THETA, M PHI)

LOAD IDENTIFICATION CLUES 000100

.1466000+04	.1466000+04

MATRIX X AND Y (TRANSPOSED) MAGIC OUTPUT

.1963008-35	.0000000	.0000000	.0000000	.1387566+01	.0000000	.0000000	.0000000
.0000000	.9406105+05	-.3423586+05	-.1774112+06	.0000000	.9702499+00	.1179897+01	.4942647+00
.0000000	-.2372457+05	.8707944+04	.4512480+05	.0000000	.1061297+00	.6695628+00	-.1257170+00
.0000000	-.1289455+06	.4693291+05	.1455240+06	.0000000	.5720037+00	.8938642+01	.6231746+00
.5194339+00	.0000000	.0000000	.0000000	.2091935-05	.0000000	.0000000	.0000000
.0000000	.8110191+00	-.1061297+00	-.5499670+00	.0000000	.7984805-06	.3918535-05	.1532199-05
.0000000	.9111047+00	.4116864+00	.7071751+01	.0000000	-.3668318-05	-.1134919-03	-.3193721-04
.0000000	.3454001+00	-.1257170+00	.5264600+00	.0000000	-.1532199-05	-.3570757-08	-.6492141-05
.0000000	-.3165693+04	-.1166896+05	-.6046889+06	.0000000	.1112270-01	.4348548+00	.1684653+00

STIFFNESS COEFFICIENTS

	DELTA T1	DELTA Z1	DELTA R1	THETA 1	DELTA T2	DELTA Z2	DELTA R2	THETA 2
FORCT1	.1027279+09	.0000000	.0000000	.0000000	-.7403779+08	.0000000	.0000000	.0000000
FORCZ1	.0000000	.2165884+08	-.5764714+08	-.1890944+08	.0000000	-.2165884+08	.6489096+08	-.6010244+07
FORCR1	.0000000	-.5764714+08	.1874687+09	.1343936+08	.0000000	.5764714+08	-.1975449+09	-.2520807+08
MOME 1	.0000000	-.1890944+08	.1343936+08	.8454789+08	.0000000	.1890944+08	-.2086280+08	.4078165+08
FORCT2	-.7403779+08	.0000000	.0000000	.0000000	.5336034+08	.0000000	.0000000	.0000000
FORCZ2	.0000000	-.2165884+08	.5764714+08	.1890944+08	.0000000	.2165884+08	-.6489096+08	.6010244+07
FORCR2	.0000000	.6489096+08	-.1975449+09	-.2086280+08	.0000000	-.6489096+08	.2332535+09	.3427213+08
MOME 2	.0000000	-.6010244+07	-.2520807+08	.4078165+08	.0000000	.6010244+07	.3427213+08	.1058464+09

SEGMENT SYMMETRY CHECK

.1027279+09	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.2165884+08	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1874687+09	.0000000	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.8454789+08	.0000000	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.5336034+08	.0000000	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.2165884+08	.0000000	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.2332535+09	.0000000
.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1000000+01	.1058464+09

SEGMENT LOAD MATRICES

.0000000
.1052735+07
.7060087+06
-.1956293+07
.0000000
.1536373+07
-.6442654+05

.2381258+07

RZERO(I) = 2.465028+01 RZERO(J) = 3.420240+01

INPUT DATA FOR REGION COUPLING

NUMBER OF REGION JOINTS 9 NUMBER OF KINEMATIC LINKS 0

REGION	JOINT(I)	JOINT(J)
1	1	2
2	2	3
3	3	4
4	4	5
5	5	6
6	6	7
7	7	8
8	8	9

BOUNDARY CONDITIONS

JOINT	DELTA T	DELTA Z	DELTA R	THETA	ANGLE ALPHA
1	0	1	0	0	.0000000
2	0	1	1	1	.0000000
3	0	1	1	1	.0000000
4	0	1	1	1	.0000000
5	0	1	1	1	.0000000
6	0	1	1	1	.0000000
7	0	1	1	1	.0000000
8	0	1	1	1	.0000000
9	0	0	0	0	.0000000

THE EXPANDED REGION JOINT DISPLACEMENT MATRIX (REGION END DEFLECTIONS)

JOINT	PROBLEM	DELTA T	DELTA Z	DELTA R	OMEGA-THETA
1	1	.0000000	-.6700190+00	.0000000	.0000000
2	1	.0000000	-.6704985+00	-.6951262-02	.9832217-03
3	1	.0000000	-.6727613+00	-.1743667-01	.1392611-02
4	1	.0000000	-.6746771+00	-.2718560-01	.8773725-03
5	1	.0000000	-.6733547+00	-.4127046-01	-.1351894-02
6	1	.0000000	-.6559306+00	-.5772956-01	-.7190935-02
7	1	.0000000	-.5874700+00	-.7075722-01	-.2005414-01
8	1	.0000000	-.3642717+00	-.5617755-01	-.4254944-01
9	1	.0000000	.0000000	.0000000	.0000000

REGION NUMBER 1

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1   SEGMENT CODE 11   SPHERE

PHI OR S	NTHETA	NPHI	OMEGATH
1.0000000-02	-3.7978581+04	-1.1393566+05	0.0000000
1.1000000-02	-4.4570165+04	-1.0734371+05	1.5901918-04
1.2000000-02	-4.9585189+04	-1.0232987+05	2.9729625-04
1.3000000-02	-5.3489697+04	-9.8428063+04	4.1895316-04
1.4000000-02	-5.6589472+04	-9.5332327+04	5.2697477-04
1.5000000-02	-5.9091888+04	-9.2835141+04	6.2358154-04
1.6000000-02	-6.1141601+04	-9.0791721+04	7.1046375-04
1.7000000-02	-6.2842006+04	-8.9098566+04	7.8893390-04
1.8000000-02	-6.4268591+04	-8.7680098+04	8.6032836-04
1.9000000-02	-6.5477510+04	-8.6480078+04	9.2458029-04
2.0000000-02	-6.6511231+04	-8.5455969+04	9.8326417-04

REGION NUMBER 2

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 SPHERE

PHI OR S	NTHETA	NPHI	OMEGATH
2.0000000-02	-6.6511220+04	-8.5455946+04	9.8322167-04
2.2000000-02	-6.8176219+04	-8.3812046+04	1.0850972-03
2.4000000-02	-6.9448021+04	-8.2563479+04	1.1690594-03
2.6000000-02	-7.0442923+04	-8.1593566+04	1.2375610-03
2.8000000-02	-7.1237178+04	-8.0825723+04	1.2924052-03
3.0000000-02	-7.1882446+04	-8.0207984+04	1.3349492-03
3.2000000-02	-7.2414737+04	-7.9704084+04	1.3662337-03
3.4000000-02	-7.2859740+04	-7.9288082+04	1.3870668-03
3.6000000-02	-7.3236184+04	-7.8941024+04	1.3980922-03
3.8000000-02	-7.3557963+04	-7.8648800+04	1.3998099-03
4.0000000-02	-7.3835561+04	-7.8400722+04	1.3928259-03

REGION NUMBER 3

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 SPHERE

PHI OR S	NTHETA	NPHI	OMEGATH
4.0000000-02	-7.3835543+04	-7.8400673+04	1.3926114-03
4.2000000-02	-7.4076976+04	-7.8188529+04	1.3769051-03
4.4000000-02	-7.4288455+04	-7.8005922+04	1.3528600-03
4.6000000-02	-7.4474844+04	-7.7847805+04	1.3206820-03
4.8000000-02	-7.4639788+04	-7.7710153+04	1.2805332-03
5.0000000-02	-7.4786956+04	-7.7589724+04	1.2325393-03
5.2000000-02	-7.4918213+04	-7.7483878+04	1.1767949-03
5.4000000-02	-7.5035752+04	-7.7390451+04	1.1133688-03
5.6000000-02	-7.5141196+04	-7.7307652+04	1.0423073-03
5.8000000-02	-7.5235872+04	-7.7233987+04	9.6363766-04
6.0000000-02	-7.5320864+04	-7.7168201+04	8.7737049-04

REGION NUMBER 4

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 SPHERE

PHI OR S	NTHETA	NPHI	OMEGATH
6.0000000-02	-7.5320884+04	-7.7168262+04	8.7737254-04
6.3000000-02	-7.5432134+04	-7.7082078+04	7.3380869-04
6.6000000-02	-7.5525950+04	-7.7008331+04	5.7309082-04
6.9000000-02	-7.5604110+04	-7.6944677+04	3.9510013-04
7.2000000-02	-7.5667928+04	-7.6889229+04	1.9967456-04
7.5000000-02	-7.5718364+04	-7.6840447+04	-1.3383682-05
7.8000000-02	-7.5756108+04	-7.6797061+04	-2.4430173-04
8.1000000-02	-7.5781629+04	-7.6758007+04	-4.9333058-04
8.4000000-02	-7.5798224+04	-7.6722390+04	-7.6074033-04
8.7000000-02	-7.5797044+04	-7.6689445+04	-1.0468159-03
8.9700000-02	-7.5788658+04	-7.6661533+04	-1.3204076-03
9.0000000-02	-7.5787136+04	-7.6658514+04	-1.3518531-03

REGION NUMBER 5

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 SPHERE

PHI OR S	NTHETA	NPHI	OMEGATH
9.0000000-02	-7.5787130+04	-7.6658513+04	-1.3518945-03
9.3907000-02	-7.5756537+04	-7.6620309+04	-1.7780812-03
9.7814000-02	-7.5705636+04	-7.6583454+04	-2.2376243-03
1.0172100-01	-7.5633928+04	-7.6547007+04	-2.7312019-03
1.0562800-01	-7.5540769+04	-7.6510141+04	-3.2594807-03
1.0953500-01	-7.5425394+04	-7.6472127+04	-3.8231043-03
1.1344200-01	-7.5286935+04	-7.6432307+04	-4.4226823-03
1.1734900-01	-7.5124446+04	-7.6390082+04	-5.0587791-03
1.2125600-01	-7.4936918+04	-7.6344901+04	-5.7319028-03
1.2516300-01	-7.4723251+04	-7.6296251+04	-6.4424934-03
1.2907000-01	-7.4482346+04	-7.6243646+04	-7.1909116-03

REGION NUMBER 6

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 SPHERE

PHI OR S	NTHETA	NPHI	OMEGATH
1.2907000-01	-7.4482338+04	-7.6243634+04	-7.1909347-03
1.3407000-01	-7.4132439+04	-7.6169816+04	-8.2043227-03
1.3907000-01	-7.3733520+04	-7.6087860+04	-9.2604042-03
1.4407000-01	-7.3283028+04	-7.5996897+04	-1.0419166-02
1.4907000-01	-7.2778394+04	-7.5896093+04	-1.1620225-02
1.5407000-01	-7.2217049+04	-7.5784645+04	-1.2882778-02
1.5907000-01	-7.1576455+04	-7.5661774+04	-1.4205557-02
1.6407000-01	-7.0914139+04	-7.5526731+04	-1.5586770-02
1.6907000-01	-7.0167715+04	-7.5378785+04	-1.7024050-02
1.7407000-01	-6.9354927+04	-7.5217232+04	-1.8514399-02
1.7897000-01	-6.8584936+04	-7.5059638+04	-1.9898054-02
1.7907000-01	-6.8473674+04	-7.5041392+04	-2.0054128-02

REGION NUMBER 7

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 SPHERE

RHI OR S	NTHETA	NPHI	OMEGATH
1.7907000-01	-6.8473676+04	-7.5041400+04	-2.0054135-02
1.8607000-01	-6.7121328+04	-7.4769980+04	-2.2284112-02
1.9307000-01	-6.5626700+04	-7.4467585+04	-2.4587153-02
2.0007000-01	-6.3986534+04	-7.4132652+04	-2.6944900-02
2.0707000-01	-6.2198982+04	-7.3763771+04	-2.9335184-02
2.1407000-01	-6.0263876+04	-7.3359714+04	-3.1731668-02
2.2107000-01	-5.8183038+04	-7.2919460+04	-3.4103496-02
2.2807000-01	-5.5960602+04	-7.2442237+04	-3.6414937-02
2.3507000-01	-5.3603362+04	-7.1927552+04	-3.8625042-02
2.4207000-01	-5.1121146+04	-7.1375234+04	-4.0687317-02
2.4907000-01	-4.8527208+04	-7.0785479+04	-4.2549421-02

REGION NUMBER 8

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 SPHERE

PHI OR S	NTHETA	NPHI	OMEGATH
2.4907000-01	-4.8527206+04	-7.0785486+04	-4.2549443-02
2.5907000-01	-4.4662545+04	-6.9879338+04	-4.4745111-02
2.6907000-01	-4.0670763+04	-6.8901595+04	-4.6218731-02
2.7907000-01	-3.6637516+04	-6.7857809+04	-4.6749777-02
2.8907000-01	-3.2671561+04	-6.6756328+04	-4.6089866-02
2.9907000-01	-2.8907439+04	-6.5608234+04	-4.3963060-02
3.0907000-01	-2.5508076+04	-6.4427880+04	-4.0067203-02
3.1907000-01	-2.2667174+04	-6.3233186+04	-3.4076087-02
3.2907000-01	-2.0611297+04	-6.2045969+04	-2.5643353-02
3.3907000-01	-1.9601471+04	-6.0892241+04	-1.4407690-02
3.4907000-01	-1.9934150+04	-5.9802479+04	3.2850240-06

HARMONIC (N) = 0

ESTIMATE 1

EIGENVALUES

5.154602-02	5.580068-01	1.484175+00	6.407445+00	2.123939+01	5.252149+01	7.242711+01	1.246345+02
2.553712+02	2.765716+02	5.592318+02	6.399332+02	1.089792+03	1.359974+03	2.320337+03	2.779940+03
4.627928+03	6.280241+03	9.803854+03	1.524000+04	2.291746+04	6.919496+04		

THE CURRENT LOAD MULTIPLICATION FACTOR = 5.154602-02

THE CURRENT FREQUENCY = 6.325210+02 RADIANS/SECOND

HARMONIC (N) = 0

ESTIMATE 2

EIGENVALUES

1.002295+00	1.085126+01	2.901602+01	1.254413+02	4.155580+02	1.023947+03	1.406389+03	2.423905+03
4.959737+03	5.371958+03	1.085848+04	1.241938+04	2.114342+04	2.638252+04	4.500892+04	5.395198+04
8.968703+04	1.218394+05	1.899273+05	2.962919+05	4.416260+05	1.343243+06		

EIGENVECTOR 1

-5.968978-03	-5.897469-03	-2.759741-05	-1.320612-04	-5.436990-03	-5.617543-05	-3.184121-04	-4.652471-03
-5.623970-05	-4.572970-04	-3.083387-03	2.757884-06	-5.676652-04	-8.974089-04	1.603591-04	-5.182986-04
1.018704-03	3.485588-04	-2.246019-04	1.119960-03	2.926265-04	1.427717-04		

EIGENVECTOR 2

-1.609242-04	-1.385270-04	1.187692-06	-4.137413-05	1.199960-06	6.829749-06	-9.428726-05	2.222644-04
1.919617-05	-1.229694-04	5.964044-04	4.891341-05	-1.175590-04	9.185187-04	8.625525-05	-3.855090-05
7.906103-04	7.765263-05	8.121732-05	1.149611-04	-1.870355-05	7.421563-05		

THE CURRENT LOAD MULTIPLICATION FACTOR = 5.166433-02

THE CURRENT FREQUENCY = 6.332465+02 RADIANS/SECOND

REGION NUMBER 1

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 SPHERE

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
1.0000000-02	0.0000000	5.9688784-05	5.9686794-03	0.00000	0.0000000	1.6092150-06	1.6091614-04	0.00000
1.1000000-02	0.0000000	6.1993755-05	5.9677662-03	-1.67991-05	0.0000000	1.8738288-06	1.6064325-04	-5.34131-06
1.2000000-02	0.0000000	6.4587769-05	5.9652390-03	-3.22893-05	0.0000000	2.1296732-06	1.5985843-04	-1.02524-05
1.3000000-02	0.0000000	6.7402224-05	5.9612127-03	-4.67663-05	0.0000000	2.3781713-06	1.5859969-04	-1.48277-05
1.4000000-02	0.0000000	7.0387802-05	5.9557775-03	-6.04407-05	0.0000000	2.6202410-06	1.5689707-04	-1.91344-05
1.5000000-02	0.0000000	7.3508055-05	5.9490054-03	-7.34663-05	0.0000000	2.8564672-06	1.5477487-04	-2.32216-05
1.6000000-02	0.0000000	7.6735383-05	5.9409550-03	-8.59580-05	0.0000000	3.0872081-06	1.5225314-04	-2.71256-05
1.7000000-02	0.0000000	8.0048444-05	5.9316751-03	-9.80029-05	0.0000000	3.3126638-06	1.4934876-04	-3.08739-05
1.8000000-02	0.0000000	8.3430413-05	5.9212070-03	-1.09660-04	0.0000000	3.5324219-06	1.4607621-04	-3.44878-05
1.9000000-02	0.0000000	8.6867799-05	5.9095855-03	-1.21007-04	0.0000000	3.7479883-06	1.4244808-04	-3.79835-05
2.0000000-02	0.0000000	9.0349618-05	5.8968412-03	-1.32061-04	0.0000000	3.9578009-06	1.3847551-04	-4.13741-05

REGION NUMBER 2

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 SPHERE

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
2.0000000-02	0.0000000	9.0349617-05	5.8968411-03	-1.32061-04	0.0000000	3.9578090-06	1.3847651-04	-4.13741-05
2.2000000-02	0.0000000	9.7411619-05	5.8680882-03	-1.53440-04	0.0000000	4.3611411-06	1.2953590-04	-4.78797-05
2.4000000-02	0.0000000	1.0455974-04	5.8351299-03	-1.74030-04	0.0000000	4.7419127-06	1.1932813-04	-5.40559-05
2.6000000-02	0.0000000	1.1175235-04	5.7981157-03	-1.93872-04	0.0000000	5.0986496-06	1.0791391-04	-5.99419-05
2.8000000-02	0.0000000	1.1895760-04	5.7571739-03	-2.13144-04	0.0000000	5.4296946-06	9.5348631-05	-6.55630-05
3.0000000-02	0.0000000	1.2615016-04	5.7124182-03	-2.31875-04	0.0000000	5.7332895-06	8.1683596-05	-7.09352-05
3.2000000-02	0.0000000	1.3330923-04	5.6639527-03	-2.50105-04	0.0000000	6.0076277-06	6.6967544-05	-7.60686-05
3.4000000-02	0.0000000	1.4041724-04	5.6118748-03	-2.67859-04	0.0000000	6.2508898-06	5.1247676-05	-8.09689-05
3.6000000-02	0.0000000	1.4745896-04	5.5562778-03	-2.85158-04	0.0000000	6.4612877-06	3.4570380-05	-8.58386-05
3.8000000-02	0.0000000	1.5442095-04	5.4972523-03	-3.02005-04	0.0000000	6.6369828-06	1.6981741-05	-9.00784-05
4.0000000-02	0.0000000	1.6129109-04	5.4348877-03	-3.18411-04	0.0000000	6.7763004-06	-1.4721047-06	-9.42872-05

REGION NUMBER 3

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 SPHERE

	V E C T O R 1				V E C T O R 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
4.0000000-02	0.0000000	1.6129109-04	5.4348869-03	-3.18412-04	0.0000000	6.7763006-06	-1.4721176-06	-9.42873-05
4.2000000-02	0.0000000	1.6805834-04	5.3692714-03	-3.34375-04	0.0000000	6.8772993-06	-2.0743847-05	-9.82546-05
4.4000000-02	0.0000000	1.7471252-04	5.3004943-03	-3.49894-04	0.0000000	6.9386189-06	-4.0785803-05	-1.01987-04
4.6000000-02	0.0000000	1.8124414-04	5.2286451-03	-3.64963-04	0.0000000	6.9587181-06	-6.1550663-05	-1.05482-04
4.8000000-02	0.0000000	1.8764428-04	5.1538144-03	-3.79578-04	0.0000000	6.9361336-06	-8.2990396-05	-1.08735-04
5.0000000-02	0.0000000	1.9390455-04	5.0760941-03	-3.93732-04	0.0000000	6.8694874-06	-1.0505621-04	-1.11743-04
5.2000000-02	0.0000000	2.0001699-04	4.9955774-03	-4.07416-04	0.0000000	6.7574926-06	-1.2789856-04	-1.14502-04
5.4000000-02	0.0000000	2.0597403-04	4.9123593-03	-4.20624-04	0.0000000	6.5989583-06	-1.5086710-04	-1.17007-04
5.6000000-02	0.0000000	2.1178845-04	4.8265365-03	-4.33345-04	0.0000000	6.3927954-06	-1.7491076-04	-1.19256-04
5.8000000-02	0.0000000	2.1739338-04	4.7382073-03	-4.45572-04	0.0000000	6.1380209-06	-1.9857773-04	-1.21245-04
6.0000000-02	0.0000000	2.2284227-04	4.6474718-03	-4.57296-04	0.0000000	5.8337629-06	-2.2301552-04	-1.22969-04

REGION NUMBER 4

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 SPHERE

	V E C T O R 1				V E C T O R 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
6.0000000-02	0.0000000	2.2284228-04	4.6474716-03	-4.57297-04	0.0000000	5.8337632-06	-2.2301552-04	-1.22969-04
6.3000000-02	0.0000000	2.3067224-04	4.5070788-03	-4.73920-04	0.0000000	5.2825881-06	-2.6024298-04	-1.25011-04
6.6000000-02	0.0000000	2.3807223-04	4.3618531-03	-4.89363-04	0.0000000	4.6164894-06	-2.9799870-04	-1.26501-04
6.9000000-02	0.0000000	2.4502378-04	4.2121537-03	-5.03598-04	0.0000000	3.8340430-06	-3.3611469-04	-1.27426-04
7.2000000-02	0.0000000	2.5150986-04	4.0583479-03	-5.16600-04	0.0000000	2.9344178-06	-3.7441965-04	-1.27776-04
7.5000000-02	0.0000000	2.5751482-04	3.9008104-03	-5.28348-04	0.0000000	1.9174084-06	-4.1223968-04	-1.27544-04
7.8000000-02	0.0000000	2.6302446-04	3.7399222-03	-5.38820-04	0.0000000	7.8346265-07	-4.5089900-04	-1.26726-04
8.1000000-02	0.0000000	2.6802602-04	3.5760702-03	-5.47999-04	0.0000000	-4.6629249-07	-4.8872062-04	-1.25317-04
8.4000000-02	0.0000000	2.7250823-04	3.4096457-03	-5.55873-04	0.0000000	-1.8300290-06	-5.2602712-04	-1.23318-04
8.7000000-02	0.0000000	2.7646132-04	3.2410438-03	-5.62429-04	0.0000000	-3.3051986-06	-5.6264131-04	-1.20730-04
8.9700000-02	0.0000000	2.7955986-04	3.0877692-03	-5.67198-04	0.0000000	-4.7254275-06	-5.9485651-04	-1.17902-04
9.0000000-02	0.0000000	2.7987705-04	3.0706624-03	-5.67662-04	0.0000000	-4.8885169-06	-5.9838700-04	-1.17559-04

REGION NUMBER 5

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 SPHERE

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
9.0000000-02	0.0000000	2.7967705-04	3.0706596-03	-5.67665-04	0.0000000	-4.8885163-06	-5.9838682-04	-1.17559-04
9.3907000-02	0.0000000	2.8351612-04	2.8467562-03	-5.72489-04	0.0000000	-7.1055449-06	-6.4331826-04	-1.12456-04
9.7814000-02	0.0000000	2.8621007-04	2.6213955-03	-5.75063-04	0.0000000	-9.4870103-06	-6.8611797-04	-1.06693-04
1.0172100-01	0.0000000	2.8797099-04	2.3954587-03	-5.75397-04	0.0000000	-1.2022971-05	-7.2652788-04	-1.00272-04
1.0562800-01	0.0000000	2.8879177-04	2.1698202-03	-5.73514-04	0.0000000	-1.4697158-05	-7.6429248-04	-9.32055-05
1.0953500-01	0.0000000	2.8867618-04	1.9453434-03	-5.69449-04	0.0000000	-1.7494934-05	-7.9916152-04	-8.55081-05
1.1344200-01	0.0000000	2.8763296-04	1.7228767-03	-5.63245-04	0.0000000	-2.0399269-05	-8.3089245-04	-7.72028-05
1.1734900-01	0.0000000	2.8567581-04	1.5032488-03	-5.54957-04	0.0000000	-2.3391543-05	-8.5925280-04	-6.83182-05
1.2125600-01	0.0000000	2.8282344-04	1.2872650-03	-5.44651-04	0.0000000	-2.6451567-05	-8.8402234-04	-5.88801-05
1.2516300-01	0.0000000	2.7909948-04	1.0757030-03	-5.32401-04	0.0000000	-2.9557629-05	-9.0499521-04	-4.89515-05
1.2907000-01	0.0000000	2.7453251-04	8.6930880-04	-5.18294-04	0.0000000	-3.2686556-05	-9.2198177-04	-3.85521-05

REGION NUMBER 6

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 SPHERE

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
1.2907000-01	0.0000000	2.7453248-04	8.6930416-04	-5.18299-04	0.0000000	-3.2686641-05	-9.2198068-04	-3.85609-05
1.3407000-01	0.0000000	2.6751453-04	6.1383704-04	-4.97685-04	0.0000000	-3.6679417-05	-9.3758012-04	-2.45901-05
1.3907000-01	0.0000000	2.5925178-04	3.6939044-04	-4.74406-04	0.0000000	-4.0616116-05	-9.4625672-04	-1.09457-05
1.4407000-01	0.0000000	2.4983769-04	1.3724236-04	-4.48709-04	0.0000000	-4.4446590-05	-9.4817994-04	2.33792-06
1.4907000-01	0.0000000	2.3937564-04	-8.1454934-05	-4.20849-04	0.0000000	-4.8122024-05	-9.4384259-04	1.52134-05
1.5407000-01	0.0000000	2.2797992-04	-2.8568407-04	-3.91103-04	0.0000000	-5.1595073-05	-9.3256172-04	2.76323-05
1.5907000-01	0.0000000	2.1577361-04	-4.7457029-04	-3.59763-04	0.0000000	-5.4820144-05	-9.1547900-04	3.95457-05
1.6407000-01	0.0000000	2.0288745-04	-6.4738785-04	-3.27130-04	0.0000000	-5.7753707-05	-8.9256059-04	5.09055-05
1.6907000-01	0.0000000	1.8945830-04	-8.0356481-04	-2.93516-04	0.0000000	-6.0354641-05	-8.6409650-04	6.16854-05
1.7407000-01	0.0000000	1.7562757-04	-9.4268626-04	-2.59234-04	0.0000000	-6.2584593-05	-8.3039951-04	7.17817-05
1.7857000-01	0.0000000	1.6295561-04	-1.0530980-03	-2.28071-04	0.0000000	-6.4245178-05	-7.9587373-04	8.03027-05
1.7907000-01	0.0000000	1.6153934-04	-1.0644959-03	-2.24601-04	0.0000000	-6.4408338-05	-7.9180364-04	8.12140-05

REGION NUMBER 7

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 SPHERE

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
1.7907000-01	0.0000000	1.6153933-04	-1.0644979-03	-2.24602-04	0.0000000	-6.4408225-05	-7.9179930-04	8.12173-05
1.8607000-01	0.0000000	1.4166316-04	-1.2057925-03	-1.76127-04	0.0000000	-6.6203478-05	-7.3031506-04	9.25955-05
1.9307000-01	0.0000000	1.2195718-04	-1.3132449-03	-1.28444-04	0.0000000	-6.7095644-05	-6.6199888-04	1.00720-04
2.0007000-01	0.0000000	1.0279750-04	-1.3876955-03	-8.23563-05	0.0000000	-6.7076141-05	-5.8908657-04	1.05743-04
2.0707000-01	0.0000000	8.4533446-05	-1.4305330-03	-3.86151-05	0.0000000	-6.6167810-05	-5.1370656-04	1.07823-04
2.1407000-01	0.0000000	6.7476964-05	-1.4436502-03	2.09800-06	0.0000000	-6.4422446-05	-4.3784203-04	1.07196-04
2.2107000-01	0.0000000	5.1892443-05	-1.4293909-03	3.91845-05	0.0000000	-6.1917242-05	-3.6329945-04	1.04137-04
2.2807000-01	0.0000000	3.7990910-05	-1.3904871-03	7.21400-05	0.0000000	-5.8750468-05	-2.9167970-04	9.89569-05
2.3507000-01	0.0000000	2.5918576-05	-1.3299894-03	1.00563-04	0.0000000	-5.5036218-05	-2.2435405-04	9.19986-05
2.4207000-01	0.0000000	1.5757646-05	-1.2511922-03	1.24163-04	0.0000000	-5.0898554-05	-1.6244526-04	8.36212-05
2.4907000-01	0.0000000	7.5222403-06	-1.1575547-03	1.42760-04	0.0000000	-4.6465213-05	-1.0681423-04	7.42102-05

REGION NUMBER 8

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 SPHERE

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
2.4907000-01	0.0000000	7.5234821-06	-1.1575332-03	1.42772-04	0.0000000	-4.6464620-05	-1.0680313-04	7.42156-05
2.5907000-01	0.0000000	-1.0220069-06	-1.0050700-03	1.60502-04	0.0000000	-3.9856044-05	-4.0258254-05	5.77750-05
2.6907000-01	0.0000000	-6.1226423-06	-8.3988733-04	1.68149-04	0.0000000	-3.3355529-05	9.2866599-06	4.05801-05
2.7907000-01	0.0000000	-8.3527979-06	-6.7182553-04	1.66325-04	0.0000000	-2.7277880-05	4.1690191-05	2.38217-05
2.8907000-01	0.0000000	-8.4289165-06	-5.0990248-04	1.56039-04	0.0000000	-2.1831344-05	5.8027979-05	8.73013-06
2.9907000-01	0.0000000	-7.1256590-06	-3.6197478-04	1.38585-04	0.0000000	-1.7098461-05	6.0489720-05	-3.66577-06
3.0907000-01	0.0000000	-5.1837471-06	-2.3447571-04	1.15483-04	0.0000000	-1.3035161-05	5.2239805-05	-1.24700-05
3.1907000-01	0.0000000	-3.2192967-06	-1.3223772-04	8.63857-05	0.0000000	-9.4916078-06	3.7252587-05	-1.69590-05
3.2907000-01	0.0000000	-1.6453301-06	-5.8901291-05	5.69997-05	0.0000000	-6.2560444-06	2.0133820-05	-1.65904-05
3.3907000-01	0.0000000	-6.1600561-07	-1.4405900-05	2.90035-05	0.0000000	-3.1276254-06	5.9392271-06	-1.10014-05
3.4907000-01	0.0000000	-2.8653932-09	-5.3527616-08	-1.66000-08	0.0000000	-3.7211066-11	-5.8886620-10	1.61375-10

BOUNDARY CONDITIONS

JOINT	DELTA T	DELTA Z	DELTA R	THETA	ANGLE ALPHA
1	1	2	0	1	.1000000-01
2	1	1	1	1	.0000000
3	1	1	1	1	.0000000
4	1	1	1	1	.0000000
5	1	1	1	1	.0000000
6	1	1	1	1	.0000000
7	1	1	1	1	.0000000
8	1	1	1	1	.0000000
9	0	0	0	0	.0000000

HARMONIC (N) = 1

ESTIMATE 1

EIGENVALUES

1.308092-01	5.500403-01	3.471592+00	1.277263+01	1.816957+01	3.780914+01	4.854556+01	8.490561+01
1.304669+02	1.510673+02	2.016592+02	3.042039+02	3.924386+02	4.205217+02	6.213542+02	8.409712+02
9.315521+02	1.238920+03	1.634772+03	1.899554+03	2.838672+03	3.195194+03	3.784597+03	6.926568+03
7.032615+03	8.827016+03	1.723652+04	2.844336+04	3.712879+04	4.182415+04	1.850165+05	

THE CURRENT LOAD MULTIPLICATION FACTOR = 1.308092-01

THE CURRENT FREQUENCY = 1.007620+03 RADIANS/SECOND

HARMONIC (N) = 1

ESTIMATE 2

EIGENVALUES

1.002009+00	4.232318+00	2.674294+01	9.838370+01	1.390451+02	2.909022+02	3.717256+02	6.510684+02
9.982551+02	1.155961+03	1.544662+03	2.327203+03	3.003066+03	3.216336+03	4.751805+03	6.432234+03
7.123340+03	9.473507+03	1.250206+04	1.452391+04	2.170288+04	2.443318+04	2.893274+04	5.292364+04
5.373209+04	6.754718+04	1.318122+05	2.173223+05	2.834901+05	3.192230+05	1.396443+06	

EIGENVECTOR 1

-1.837413-04	-1.837610-04	-1.992388-04	-1.839832-04	1.894371-04	1.866060-04	-1.943910-04	-1.831620-04
6.027010-04	1.991183-04	-2.147610-04	-1.860734-04	1.026907-03	2.201634-04	-2.047936-04	-1.705687-04
1.553971-03	2.583830-04	-1.387363-04	-1.497612-04	1.835562-03	2.673062-04	-1.932452-06	-1.134941-04
1.446277-03	2.364279-04	1.423474-04	-6.009547-05	3.825068-04	6.089381-05	1.228619-04	

EIGENVECTOR 2

1.522988-05	1.519597-05	-1.505761-04	1.507069-05	1.432622-04	-1.306789-05	-1.427362-04	1.573035-05
4.250854-04	-4.586987-06	-1.340622-04	1.787788-05	6.554901-04	6.735619-06	-9.078442-05	2.348574-05
7.793233-04	1.556231-05	1.214868-05	3.245021-05	4.753138-04	-1.490788-05	1.337604-04	3.942244-05
-2.892928-04	-1.144342-04	1.417763-04	3.066791-05	-6.395802-04	-1.607048-04	-4.753564-05	

THE CURRENT LOAD MULTIPLICATION FACTOR = 1.316720-01

THE CURRENT FREQUENCY = 1.068631+03 RADIANS/SECOND

REGION NUMBER 1

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 SPHERE

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
1.0000000-02	-1.8374132-04	1.8376101-04	1.4210855-14	-1.99239-04	1.5229881-05	-1.5195971-05	1.7763568-15	-1.50676-04
1.1000000-02	-1.8377805-04	1.8374976-04	-1.9822517-05	-1.93986-04	1.5203536-05	-1.5205129-05	-1.4827120-05	-1.46588-04
1.2000000-02	-1.8381315-04	1.8371797-04	-3.9237924-05	-1.90945-04	1.5178722-05	-1.5229503-05	-2.9330486-05	-1.44150-04
1.3000000-02	-1.8384592-04	1.8366658-04	-5.8427881-05	-1.89381-04	1.5155913-05	-1.5268424-05	-4.3660310-05	-1.42727-04
1.4000000-02	-1.8387590-04	1.8359612-04	-7.7514841-05	-1.88823-04	1.5135426-05	-1.5321495-05	-5.7875667-05	-1.41976-04
1.5000000-02	-1.8390277-04	1.8350689-04	-9.6582602-05	-1.88956-04	1.5117483-05	-1.5388489-05	-7.2089527-05	-1.41668-04
1.6000000-02	-1.8392628-04	1.8339900-04	-1.1568898-04	-1.89568-04	1.5102249-05	-1.5469293-05	-8.6188040-05	-1.41649-04
1.7000000-02	-1.8394623-04	1.8327247-04	-1.3487392-04	-1.90509-04	1.5089853-05	-1.5563862-05	-1.0034443-04	-1.41812-04
1.8000000-02	-1.8396248-04	1.8312724-04	-1.5416476-04	-1.91674-04	1.5080403-05	-1.5672200-05	-1.1462287-04	-1.42082-04
1.9000000-02	-1.8397482-04	1.8296319-04	-1.7357987-04	-1.92987-04	1.5073988-05	-1.5794340-05	-1.2873110-04	-1.42403-04
2.0000000-02	-1.8398319-04	1.8278017-04	-1.9313104-04	-1.94391-04	1.5070689-05	-1.5930332-05	-1.4297222-04	-1.42736-04

REGION NUMBER 2

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 SPHERE

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
2.0000000-02	-1.8398320-04	1.8278018-04	-1.9313104-04	-1.94391-04	1.5070690-05	-1.5930332-05	-1.4297222-04	-1.42736-04
2.2000000-02	-1.8398745-04	1.8235645-04	-2.3266597-04	-1.97320-04	1.5072756-05	-1.6243796-05	-1.7154824-04	-1.43322-04
2.4000000-02	-1.8397441-04	1.8185467-04	-2.7270741-04	-2.00238-04	1.5088191-05	-1.6613368-05	-2.0022220-04	-1.43703-04
2.6000000-02	-1.8394329-04	1.8127328-04	-3.1347901-04	-2.03016-04	1.5117387-05	-1.7039507-05	-2.2894355-04	-1.43793-04
2.8000000-02	-1.8389335-04	1.8061073-04	-3.5470435-04	-2.05578-04	1.5160685-05	-1.7522555-05	-2.5764841-04	-1.43542-04
3.0000000-02	-1.8382389-04	1.7986555-04	-3.9641506-04	-2.07878-04	1.5218385-05	-1.8062704-05	-2.8626551-04	-1.42922-04
3.2000000-02	-1.8373425-04	1.7903638-04	-4.3855547-04	-2.09487-04	1.5290743-05	-1.8659973-05	-3.1471961-04	-1.41921-04
3.4000000-02	-1.8362381-04	1.7812199-04	-4.8106559-04	-2.11590-04	1.5377969-05	-1.9314199-05	-3.4293361-04	-1.40534-04
3.6000000-02	-1.8349199-04	1.7712130-04	-5.2388279-04	-2.12476-04	1.5480234-05	-2.0025034-05	-3.7082992-04	-1.38758-04
3.8000000-02	-1.8333822-04	1.7603335-04	-5.6694302-04	-2.14041-04	1.5597664-05	-2.0791940-05	-3.9833127-04	-1.36600-04
4.0000000-02	-1.8316199-04	1.7485738-04	-6.1018190-04	-2.14781-04	1.5730347-05	-2.1614188-05	-4.2536130-04	-1.34062-04

REGION NUMBER 3

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 SPHERE

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
4.0000000-02	-1.8316203-04	1.7485737-04	-6.1018147-04	-2.14781-04	1.5730350-05	-2.1614169-05	-4.2536126-04	-1.34062-04
4.2000000-02	-1.8296285-04	1.7359268-04	-6.5353316-04	-2.15197-04	1.5877014-05	-2.2490172-05	-4.5184426-04	-1.31152-04
4.4000000-02	-1.8274028-04	1.7223880-04	-6.9693321-04	-2.15291-04	1.6039098-05	-2.3419436-05	-4.7770948-04	-1.27904-04
4.6000000-02	-1.8249389-04	1.7079541-04	-7.4031704-04	-2.15064-04	1.6216555-05	-2.4400703-05	-5.0288992-04	-1.24324-04
4.8000000-02	-1.8222329-04	1.6926232-04	-7.8362061-04	-2.14519-04	1.6409299-05	-2.5432519-05	-5.2732010-04	-1.20423-04
5.0000000-02	-1.8192812-04	1.6763952-04	-8.2678049-04	-2.13659-04	1.6617214-05	-2.6513258-05	-5.5093629-04	-1.16207-04
5.2000000-02	-1.8160805-04	1.6592712-04	-8.6973402-04	-2.12489-04	1.6840145-05	-2.7641129-05	-5.7367662-04	-1.11688-04
5.4000000-02	-1.8126280-04	1.6412543-04	-9.1241933-04	-2.11013-04	1.7077911-05	-2.8814170-05	-5.9548124-04	-1.06875-04
5.6000000-02	-1.8089208-04	1.6223488-04	-9.5477544-04	-2.09235-04	1.7330291-05	-3.0030262-05	-6.1629242-04	-1.01779-04
5.8000000-02	-1.8049565-04	1.6025608-04	-9.9674234-04	-2.07160-04	1.7597038-05	-3.1287122-05	-6.3605462-04	-9.64118-05
6.0000000-02	-1.8007332-04	1.5818978-04	-1.0382610-03	-2.04794-04	1.7877671-05	-3.2582314-05	-6.5471463-04	-9.07847-05

REGION NUMBER 4

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 SPHERE

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
6.0000000-02	-1.8007336-04	1.5818979-04	-1.0382608-03	-2.04794-04	1.7877875-05	-3.2582316-05	-6.5471449-04	-9.07844-05
6.3000000-02	-1.7939100-04	1.5492844-04	-1.0995718-03	-2.00709-04	1.8321735-05	-3.4589407-05	-6.8051863-04	-8.18453-05
6.6000000-02	-1.7864944-04	1.5147600-04	-1.1595535-03	-1.96002-04	1.8795703-05	-3.6667388-05	-7.0357388-04	-7.25047-05
6.9000000-02	-1.7784832-04	1.4783694-04	-1.2180214-03	-1.90692-04	1.9298432-05	-3.8806301-05	-7.2376462-04	-6.27966-05
7.2000000-02	-1.7698741-04	1.4401649-04	-1.2747975-03	-1.84802-04	1.9828448-05	-4.0995658-05	-7.4098582-04	-5.27574-05
7.5000000-02	-1.7606658-04	1.4002061-04	-1.3297111-03	-1.78357-04	2.0364166-05	-4.3224465-05	-7.5514382-04	-4.24260-05
7.8000000-02	-1.7508587-04	1.3585600-04	-1.3825987-03	-1.71382-04	2.0963895-05	-4.5481263-05	-7.6615690-04	-3.18430-05
8.1000000-02	-1.7404541-04	1.3153306-04	-1.4333049-03	-1.63903-04	2.1565843-05	-4.7754161-05	-7.7395575-04	-2.10504-05
8.4000000-02	-1.7294544-04	1.2705088-04	-1.4816823-03	-1.55950-04	2.2188126-05	-5.0030888-05	-7.7848398-04	-1.00916-05
8.7000000-02	-1.7178635-04	1.2242725-04	-1.5275926-03	-1.47551-04	2.2828773-05	-5.2296838-05	-7.7969830-04	9.89356-07
8.9700000-02	-1.7069300-04	1.1815024-04	-1.5666952-03	-1.39637-04	2.3419364-05	-5.4321839-05	-7.7793287-04	1.10294-05
9.0000000-02	-1.7056860-04	1.1766857-04	-1.5709062-03	-1.38738-04	2.3485734-05	-5.4545120-05	-7.7756888-04	1.21474-05

REGION NUMBER 5

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 SPHERE

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
9.0000000-02	-1.7056870-04	1.1766861-04	-1.5709047-03	-1.38736-04	2.3486743-05	-6.4545123-05	-7.7764789-04	1.21487-05
9.3907000-02	-1.6889616-04	1.1128568-04	-1.6232227-03	-1.26689-04	2.4355229-05	-5.7411019-05	-7.6974991-04	2.67030-05
9.7814000-02	-1.6712675-04	1.0471449-04	-1.6706937-03	-1.14066-04	2.5244597-05	-6.0180499-05	-7.5629693-04	4.09252-05
1.0172100-01	-1.6526231-04	9.7980264-05	-1.7131073-03	-1.00946-04	2.6148750-05	-6.2848871-05	-7.3735409-04	5.47384-05
1.0562800-01	-1.6330498-04	9.1109704-05	-1.7502836-03	-8.74056-05	2.7062491-05	-6.5364052-05	-7.1309670-04	6.80650-05
1.0953500-01	-1.6125715-04	8.4130777-05	-1.7820738-03	-7.35264-05	2.7980553-05	-6.7706772-05	-6.8373010-04	8.08314-05
1.1344200-01	-1.5912145-04	7.7072576-05	-1.8083609-03	-5.93898-05	2.8897631-05	-6.9850777-05	-6.4948910-04	9.29610-05
1.1734900-01	-1.5690078-04	6.9965129-05	-1.8290605-03	-4.50792-05	2.9808410-05	-7.1771049-05	-6.1063694-04	1.04384-04
1.2125600-01	-1.5459823-04	6.2839213-05	-1.8441207-03	-3.06781-05	3.0707589-05	-7.3444024-05	-5.6746408-04	1.15032-04
1.2516300-01	-1.5221714-04	5.5726138-05	-1.8535225-03	-1.62703-05	3.1589913-05	-7.4847820-05	-5.2028659-04	1.24843-04
1.2907000-01	-1.4976100-04	4.8657539-05	-1.8572797-03	-1.93883-06	3.2450191-05	-7.5962457-05	-4.6944433-04	1.33758-04

REGION NUMBER 6

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 SPHERE

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
1.2907000-01	-1.4976116-04	4.8657676-05	-1.8572734-03	-1.93245-06	3.2450211-05	-7.5962434-05	-4.6944137-04	1.33760-04
1.3407000-01	-1.4651511-04	3.9727078-05	-1.8539208-03	1.61685-05	3.3494956-05	-7.6926924-05	-3.9967198-04	1.43469-04
1.3907000-01	-1.4318045-04	3.0987249-05	-1.8415743-03	3.38387-05	3.4468337-05	-7.7360059-05	-3.2952822-04	1.51234-04
1.4407000-01	-1.3970570-04	2.2502961-05	-1.8204911-03	5.09164-05	3.5414262-05	-7.7240825-05	-2.4799752-04	1.57007-04
1.4907000-01	-1.3615975-04	1.4336858-05	-1.7910079-03	6.72476-05	3.6269197-05	-7.6556917-05	-1.6808720-04	1.60757-04
1.5407000-01	-1.3253175-04	6.5485737-06	-1.7535361-03	8.26879-05	3.7042249-05	-7.5305128-05	-8.6814302-05	1.62477-04
1.5907000-01	-1.2883111-04	-8.0613335-07	-1.7085570-03	9.71039-05	3.7725247-05	-7.3491638-05	-5.1950644-06	1.62177-04
1.6407000-01	-1.2506735-04	-7.6762356-06	-1.6566157-03	1.10375-04	3.8310813-05	-7.1132162-05	7.5765792-05	1.59892-04
1.6907000-01	-1.2125013-04	-1.4016245-05	-1.5983144-03	1.22395-04	3.8792429-05	-6.8251965-05	1.5508572-04	1.55677-04
1.7407000-01	-1.1738911-04	-1.9786970-05	-1.5343049-03	1.33073-04	3.9164499-05	-6.4885716-05	2.3181481-04	1.49606-04
1.7857000-01	-1.1380469-04	-2.4467103-05	-1.4723884-03	1.41473-04	3.9401857-05	-6.1476503-05	2.9790506-04	1.42633-04
1.7907000-01	-1.1349391-04	-2.4956193-05	-1.4652809-03	1.42333-04	3.9422398-05	-6.1077174-05	3.0504593-04	1.41774-04

REGION NUMBER 7

THERE ARE 1 SEGMENTS AND 6 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 SPHERE

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
1.7907000-01	-1.1349414-04	-2.4965625-05	-1.4652620-03	1.42347-04	3.9422444-05	-6.1077116-05	3.0504932-04	1.41776-04
1.8607000-01	-1.0800335-04	-3.1139459-05	-1.3615850-03	1.52818-04	3.9544478-05	-5.5087438-05	3.9967885-04	1.27067-04
1.9307000-01	-1.0248972-04	-3.6056586-05	-1.2515815-03	1.60300-04	3.9433015-05	-4.8520734-05	4.8324321-04	1.10346-04
2.0007000-01	-9.6977611-05	-3.9698470-05	-1.1373678-03	1.64762-04	3.9065745-05	-4.1559925-05	5.5445811-04	9.19831-05
2.0707000-01	-9.1489948-05	-4.2089634-05	-1.0210579-03	1.66241-04	3.8504508-05	-3.4399843-05	6.1231137-04	7.23803-05
2.1407000-01	-8.6047839-05	-4.3287022-05	-9.0471605-04	1.64841-04	3.7695090-05	-2.7241359-05	6.5608139-04	5.19603-05
2.2107000-01	-8.0670255-05	-4.3378056-05	-7.9031059-04	1.60729-04	3.6666980-05	-2.0284872-05	6.8534785-04	3.11554-05
2.2807000-01	-7.5373740-05	-4.2477377-05	-6.7967059-04	1.54133-04	3.5433058-05	-1.3723438-05	6.9999490-04	1.03972-05
2.3507000-01	-7.0172179-05	-4.0722335-05	-5.7444692-04	1.45331-04	3.4007222-05	-7.7350266-06	7.0020834-04	-9.89503-06
2.4207000-01	-6.5076610-05	-3.8267352-05	-4.7607827-04	1.34647-04	3.2413951-05	-2.4798446-06	6.8645347-04	-2.93243-05
2.4907000-01	-6.0095121-05	-3.5277358-05	-3.8576303-04	1.22436-04	3.0667703-05	1.9137255-06	6.5997569-04	-4.75255-05

REGION NUMBER 0

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 SPHERE

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
2.4907000-01	-6.0095475-05	-3.5274725-05	-3.8571589-04	1.22462-04	3.0667907-05	1.9127056-06	6.5945817-04	-4.75356-05
2.5907000-01	-5.3187254-05	-3.0409587-05	-2.7243330-04	1.03160-04	2.7860295-05	6.5551284-06	6.0032861-04	-6.95000-05
2.6907000-01	-4.6526340-05	-2.5261749-05	-1.7916203-04	8.27374-05	2.4901297-05	9.2300966-06	5.2266516-04	-8.44016-05
2.7907000-01	-4.0106300-05	-2.0239443-05	-1.0643372-04	6.23704-05	2.1795419-05	1.0129267-05	4.3355773-04	-9.23618-05
2.8907000-01	-3.3911235-05	-1.5653996-05	-5.3618632-05	4.31890-05	1.8621115-05	9.6002879-06	3.4004081-04	-9.33612-05
2.9907000-01	-2.7918030-05	-1.1694747-05	-1.8999320-05	2.62264-05	1.5427113-05	8.0931183-06	2.4876637-04	-8.80101-05
3.0907000-01	-2.2099009-05	-8.4201864-06	1.1080672-07	1.23794-05	1.2249952-05	6.0925734-06	1.6571422-04	-7.71046-05
3.1907000-01	-1.6424723-05	-5.7690723-06	7.2141996-06	2.37898-06	9.1129511-06	4.0437268-06	9.5952739-05	-6.16522-05
3.2907000-01	-1.0866559-05	-3.5738858-06	6.4527019-06	-3.22809-06	6.0267391-06	2.2785237-06	4.3458561-05	-4.20108-05
3.3907000-01	-5.3987942-06	-1.7155180-06	2.4196331-06	-4.07995-06	2.9913614-06	9.5290997-07	1.0998644-05	-2.18267-05
3.4907000-01	2.6652318-10	-1.5922227-09	-2.8785228-08	-8.17252-09	-1.4901949-10	3.8830568-09	7.3210920-08	2.31724-08

BOUNDARY CONDITIONS

JOINT	DELTA T	DELTA Z	DELTA R	THETA	ANGLE ALPHA
1	0	0	0	0	.0000000
2	1	1	1	1	.0000000
3	1	1	1	1	.0000000
4	1	1	1	1	.0000000
5	1	1	1	1	.0000000
6	1	1	1	1	.0000000
7	1	1	1	1	.0000000
8	1	1	1	1	.0000000
9	0	0	0	0	.0000000

HARMONIC (N) = 2

ESTIMATE 1

EIGENVALUES

1.176530-02	1.124612+00	5.859384+00	1.988959+01	4.240133+01	5.363517+01	8.737032+01	1.174472+02
1.915010+02	2.480317+02	2.695797+02	4.205581+02	5.229307+02	6.289171+02	8.530354+02	1.046314+03
1.313449+03	1.790680+03	2.184141+03	2.555278+03	4.115178+03	4.359919+03	5.506028+03	8.817177+03
1.160991+04	1.651343+04	2.211859+04	6.163678+04				

THE CURRENT LOAD MULTIPLICATION FACTOR = 1.176530-02

THE CURRENT FREQUENCY = 3.021891+02 RADIANS/SECOND

HARMONIC (N) = 2

ESTIMATE 2

EIGENVALUES

1.003921+00	9.634321+01	5.026252+02	1.705383+03	3.608384+03	4.583116+03	7.439524+03	1.000879+04
1.628895+04	2.111239+04	2.295188+04	3.575867+04	4.446262+04	5.343412+04	7.257081+04	8.910877+04
1.115507+05	1.522773+05	1.855920+05	2.179137+05	3.507864+05	3.716229+05	4.691603+05	7.605936+05
9.875536+05	1.402707+06	1.875856+06	5.169702+06				

EIGENVECTOR 1

-6.566959-05	1.140456-04	5.291412-05	-1.911740-04	-1.987390-04	6.989830-04	1.604789-04	-3.848052-04
-2.199651-04	1.601475-03	2.840106-04	-5.105832-04	-3.040293-04	3.223194-03	5.061647-04	-5.459628-04
-3.616443-04	4.976558-03	7.938223-04	-3.171483-04	-3.850274-04	5.291196-03	9.287158-04	1.890548-04
-2.098576-04	2.465059-03	5.001767-04	4.885927-04				

EIGENVECTOR 2

-3.703785-06	2.389785-05	3.277072-06	-3.953443-05	-7.999465-06	1.404219-04	1.176461-05	-7.320154-05
-1.046333-05	3.000788-04	2.343772-05	-8.253127-05	-9.888555-06	5.088841-04	4.180297-05	-4.807474-05
-1.688899-06	5.136597-04	4.188706-05	4.928861-05	1.352923-05	3.708685-05	-2.743896-05	1.205592-04
2.012883-05	-4.551549-04	-1.137973-04	-5.795747-06				

THE CURRENT LOAD MULTIPLICATION FACTOR = 1.181142-02

THE CURRENT FREQUENCY = 3.027809+02 RADIANS/SECOND

REGION NUMBER 1

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 SPHERE

	V E C T O R 1				V E C T O R 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
1.0000000-02	0.0000000	0.0000000	0.0000000	0.00000	0.0000000	0.0000000	0.0000000	0.00000
1.1000000-02	-1.0474265-05	4.3713316-06	-1.8587397-06	-3.55357-05	-5.8894625-07	2.4993316-07	-3.9101840-07	-7.47881-06
1.2000000-02	-1.9186959-05	9.3266982-06	-6.8613986-06	-6.33675-05	-1.0799853-06	5.3102367-07	-1.4421003-06	-1.33190-05
1.3000000-02	-2.6726863-05	1.4545618-05	-1.4386150-05	-8.62196-05	-1.5057380-06	8.2525334-07	-3.0206806-06	-1.80957-05
1.4000000-02	-3.3455999-05	1.9856971-05	-2.4023795-05	-1.05732-04	-1.8862075-06	1.1228910-06	-5.0390960-06	-2.21545-05
1.5000000-02	-3.9606232-05	2.5168250-05	-3.5495523-05	-1.22930-04	-2.2341564-06	1.4185692-06	-7.4371898-06	-2.57118-05
1.6000000-02	-4.5331311-05	3.0429644-05	-4.8605435-05	-1.38479-04	-2.5580036-06	1.7092922-06	-1.0172270-05	-2.89071-05
1.7000000-02	-5.0736281-05	3.5615070-05	-6.3212005-05	-1.52819-04	-2.8634616-06	1.9933843-06	-1.3213074-05	-3.18331-05
1.8000000-02	-5.5894797-05	4.0711808-05	-7.9210315-05	-1.66252-04	-3.1544995-06	2.2699142-06	-1.6536010-05	-3.45527-05
1.9000000-02	-6.0859684-05	4.5714690-05	-9.6520651-05	-1.78988-04	-3.4339312-06	2.5383733-06	-2.0122743-05	-3.71096-05
2.0000000-02	-6.5669587-05	5.0622780-05	-1.1508099-04	-1.91174-04	-3.7037849-06	2.7984914-06	-2.3958613-05	-3.95344-05

REGION NUMBER 2

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1   SEGMENT CODE 11   SPHERE

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
2.0000000-02	-6.5669593-05	5.0622780-05	-1.1508099-04	-1.91174-04	-3.7037852-06	2.7984914-06	-2.3958612-05	-3.95344-05
2.2000000-02	-7.4932459-05	6.0161112-05	-1.5576325-04	-2.14297-04	-4.2196089-06	3.2929646-06	-3.2330641-05	-4.40628-05
2.4000000-02	-8.3840914-05	6.9348221-05	-2.0095747-04	-2.36173-04	-4.7105673-06	3.7530578-06	-4.1574989-05	-4.82610-05
2.6000000-02	-9.2487271-05	7.8208811-05	-2.5044692-04	-2.57105-04	-5.1809677-06	4.1785476-06	-5.1631911-05	-5.21865-05
2.8000000-02	-1.0093141-04	8.6764730-05	-3.0406058-04	-2.77261-04	-5.6331982-06	4.5691060-06	-6.2450124-05	-5.58692-05
3.0000000-02	-1.0921022-04	9.5033356-05	-3.6165283-04	-2.96734-04	-6.0685140-06	4.9242178-06	-7.3982609-05	-5.93232-05
3.2000000-02	-1.1734812-04	1.0302764-04	-4.2309181-04	-3.15572-04	-6.4874977-06	5.2431908-06	-8.6184215-05	-6.25540-05
3.4000000-02	-1.2536119-04	1.1075666-04	-4.8825256-04	-3.33796-04	-6.8902941-06	5.5251923-06	-9.9010264-05	-6.55613-05
3.6000000-02	-1.3325996-04	1.1822631-04	-5.5701280-04	-3.51414-04	-7.2787759-06	5.7692924-06	-1.1241572-04	-6.83420-05
3.8000000-02	-1.4105120-04	1.2543989-04	-6.2925029-04	-3.68421-04	-7.6466387-06	5.9745039-06	-1.2635467-04	-7.08908-05
4.0000000-02	-1.4873903-04	1.3239867-04	-7.0484127-04	-3.84805-04	-7.9994842-06	6.1398167-06	-1.4078005-04	-7.32015-05

REGION NUMBER 3

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 SPHERE

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
4.0000000-02	-1.4873904-04	1.3239867-04	-7.0484130-04	-3.84805-04	-7.9994651-06	6.1398168-06	-1.4028005-04	-7.32015-05
4.2000000-02	-1.5632571-04	1.3910231-04	-7.8365935-04	-4.00552-04	-8.3332084-06	6.2636960-06	-1.5564237-04	-7.52601-05
4.4000000-02	-1.6381212-04	1.4554721-04	-8.6557486-04	-4.15645-04	-8.6490383-06	6.3456708-06	-1.7009384-04	-7.70895-05
4.6000000-02	-1.7119817-04	1.5173685-04	-9.5045459-04	-4.30065-04	-8.9463761-06	6.3848385-06	-1.8648763-04	-7.86806-05
4.8000000-02	-1.7848300-04	1.5766196-04	-1.0381615-03	-4.43793-04	-9.2246431-06	6.3803527-06	-2.0237517-04	-8.00253-05
5.0000000-02	-1.8566523-04	1.6332076-04	-1.1285548-03	-4.56809-04	-9.4832702-06	6.3314412-06	-2.1850630-04	-8.11159-05
5.2000000-02	-1.9274305-04	1.6870909-04	-1.2214896-03	-4.69095-04	-9.7217045-06	6.2374215-06	-2.3482941-04	-8.19453-05
5.4000000-02	-1.9971437-04	1.7382257-04	-1.3168177-03	-4.80633-04	-9.9394155-06	6.0977131-06	-2.5129150-04	-8.25071-05
5.6000000-02	-2.0657683-04	1.7865669-04	-1.4143869-03	-4.91405-04	-1.0135099-05	5.9110498-06	-2.6783838-04	-8.27954-05
5.8000000-02	-2.1332795-04	1.8320689-04	-1.5140418-03	-5.01393-04	-1.0310683-05	5.6794885-06	-2.8441472-04	-8.28051-05
6.0000000-02	-2.1996511-04	1.8746866-04	-1.6156236-03	-5.10583-04	-1.0463328-05	5.4004191-06	-3.0096420-04	-8.25313-05

REGION NUMBER 4

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 SPHERE

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
6.0000000-02	-2.1996512-04	1.8746867-04	-1.6156235-03	-5.10583-04	-1.0463329-05	5.4004190-06	-3.0096418-04	-8.25313-05
6.3000000-02	-2.2970167-04	1.9331130-04	-1.7712546-03	-5.22840-04	-1.0645620-05	4.8931225-06	-3.2559805-04	-8.15087-05
6.6000000-02	-2.3916656-04	1.9848104-04	-1.9302993-03	-5.33224-04	-1.0776336-05	4.2810403-06	-3.4984775-04	-7.99773-05
6.9000000-02	-2.4835048-04	2.0296491-04	-2.0921883-03	-5.41699-04	-1.0854441-05	3.5653248-06	-3.7355712-04	-7.79170-05
7.2000000-02	-2.5724422-04	2.0675142-04	-2.2563419-03	-5.48235-04	-1.0879125-05	2.7477706-06	-3.9666488-04	-7.53134-05
7.5000000-02	-2.6583874-04	2.0983077-04	-2.4221727-03	-5.52808-04	-1.0849803-05	1.8308653-06	-4.1870630-04	-7.21576-05
7.8000000-02	-2.7412529-04	2.1219510-04	-2.5890873-03	-5.55404-04	-1.0766116-05	8.1782984-07	-4.3981464-04	-6.84451-05
8.1000000-02	-2.8209543-04	2.1383861-04	-2.7564890-03	-5.56014-04	-1.0627932-05	-2.8735044-07	-4.5972247-04	-6.41756-05
8.4000000-02	-2.8974113-04	2.1475771-04	-2.9237796-03	-5.54636-04	-1.0439350-05	-1.4799016-06	-4.7026280-04	-5.93523-05
8.7000000-02	-2.9705479-04	2.1495117-04	-3.0903619-03	-5.51283-04	-1.0188701-05	-2.7542434-06	-4.9527019-04	-5.39821-05
8.9700000-02	-3.0334727-04	2.1450581-04	-3.2391894-03	-5.46583-04	-9.9209545-06	-3.9656112-06	-5.0913147-04	-4.86894-05
9.0000000-02	-3.0402926-04	2.1442020-04	-3.2556420-03	-5.45963-04	-9.8885534-06	-4.1039779-06	-5.1058173-04	-4.80749-05

REGION NUMBER 5

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 SPHERE

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
9.0000000-02	-3.0402929-04	2.1442020-04	-3.2556417-03	-5.45963-04	-9.8885548-06	-4.1039775-06	-5.1058165-04	-4.80747-05
9.3907000-02	-3.1259435-04	2.1265013-04	-3.4679683-03	-5.36125-04	-9.4112947-06	-5.9623978-06	-5.2768373-04	-3.95180-05
9.7814000-02	-3.2055972-04	2.0987284-04	-3.6758095-03	-5.23062-04	-8.8472611-06	-7.9182511-06	-5.4137210-04	-3.06376-05
1.0172100-01	-3.2791369-04	2.0551071-04	-3.8779174-03	-5.06864-04	-8.1994616-06	-9.9525626-06	-5.5152044-04	-2.14385-05
1.0562800-01	-3.3464617-04	2.0019378-04	-4.0730828-03	-4.87638-04	-7.4715140-06	-1.2045276-05	-5.5800706-04	-1.19384-05
1.0953500-01	-3.4074880-04	1.9375977-04	-4.2601431-03	-4.65514-04	-6.6675913-06	-1.4175249-05	-5.6071943-04	-2.16573-06
1.1344200-01	-3.4621493-04	1.8625401-04	-4.4379896-03	-4.40638-04	-5.7923836-06	-1.6320294-05	-5.5955781-04	7.84298-06
1.1734900-01	-3.5103970-04	1.7772930-04	-4.6055745-03	-4.13175-04	-4.8510652-06	-1.8457244-05	-5.5443832-04	1.80441-05
1.2125600-01	-3.5522005-04	1.6824572-04	-4.7619103-03	-3.83306-04	-3.8492674-06	-2.0562059-05	-5.4529530-04	2.83884-05
1.2516300-01	-3.5875471-04	1.5787034-04	-4.9061154-03	-3.51228-04	-2.7930541-06	-2.2609944-05	-5.3208334-04	3.88222-05
1.2907000-01	-3.6164425-04	1.4667682-04	-5.0373398-03	-3.17151-04	-1.6886982-06	-2.4575501-05	-5.1437885-04	4.92882-05

REGION NUMBER 6

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 SPHERE

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
1.2907000-01	-3.6164430-04	1.4667689-04	-5.0373373-03	-3.17148-04	-1.6888993-06	-2.4575496-05	-5.1477847-04	4.92886-05
1.3407000-01	-3.6440934-04	1.3128814-04	-5.1851739-03	-2.70975-04	-2.1387947-07	-2.6920299-05	-4.8671353-04	6.22680-05
1.3907000-01	-3.6613153-04	1.1487161-04	-5.3092220-03	-2.22396-04	1.3145429-06	-2.9038158-05	-4.5243414-04	7.40924-05
1.4407000-01	-3.6682505-04	9.7621313-05	-5.4084022-03	-1.71927-04	2.8804398-06	-3.0884353-05	-4.1253344-04	8.47034-05
1.4907000-01	-3.6650883-04	7.9742205-05	-5.4818982-03	-1.20131-04	4.4675097-06	-3.2419081-05	-3.6763468-04	9.40408-05
1.5407000-01	-3.6520640-04	6.1447618-05	-5.5291635-03	-6.74580-05	6.0593147-06	-3.3607966-05	-3.1839105-04	1.02046-04
1.5907000-01	-3.6294577-04	4.2956464-05	-5.5499256-03	-1.45470-05	7.6394882-06	-3.4422589-05	-2.6548379-04	1.08667-04
1.6407000-01	-3.5975927-04	2.4490216-05	-5.5441863-03	3.80874-05	9.1919238-06	-3.4840998-05	-2.0961881-04	1.13858-04
1.6907000-01	-3.5568329-04	6.2697164-06	-5.5122191-03	8.99086-05	1.0700949-05	-3.4848182-05	-1.5152227-04	1.17584-04
1.7407000-01	-3.5075805-04	-1.1488130-05	-5.4545635-03	1.40396-04	1.2151492-05	-3.4436483-05	-9.1935175-05	1.19821-04
1.7857000-01	-3.4563532-04	-2.6901196-05	-5.3813629-03	1.84278-04	1.3395127-05	-3.3707671-05	-3.7652017-05	1.20552-04
1.7907000-01	-3.4502732-04	-2.8573736-05	-5.3720158-03	1.89047-04	1.3529234-05	-3.3605931-05	-3.1607363-05	1.20559-04

REGION NUMBER 7

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 SPHERE

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
1.7907000-01	-3.4502743-04	-2.8573450-05	-5.3720061-03	1.69055-04	1.3529233-05	-3.3605910-05	-3.1606544-05	1.20559-04
1.8607000-01	-3.3575451-04	-5.0992698-05	-5.2166492-03	2.53165-04	1.5266387-05	-3.1736067-05	5.1865554-05	1.16856-04
1.9307000-01	-3.2513375-04	-7.1211058-05	-5.0182022-03	3.11550-04	1.6809194-05	-2.9150735-05	1.3185300-04	1.10662-04
2.0007000-01	-3.1331247-04	-8.8802070-05	-4.7810578-03	3.03192-04	1.8129889-05	-2.5963536-05	2.0664504-04	1.02093-04
2.0707000-01	-3.0044297-04	-1.0342495-04	-4.5102766-03	4.07210-04	1.9206728-05	-2.2264477-05	2.7462699-04	9.13111-05
2.1407000-01	-2.8668188-04	-1.1463701-04	-4.2114579-03	4.42945-04	2.0024223-05	-1.8197407-05	3.3432341-04	7.85247-05
2.2107000-01	-2.7218627-04	-1.2292280-04	-3.8905996-03	4.69926-04	2.0573304-05	-1.3916399-05	3.8490774-04	6.39817-05
2.2807000-01	-2.5711092-04	-1.2759919-04	-3.5539498-03	4.87910-04	2.0851387-05	-9.5891053-06	4.2374792-04	4.79628-05
2.3507000-01	-2.4160531-04	-1.2901594-04	-3.2078559-03	4.96861-04	2.0862321-05	-5.3912261-06	4.5141725-04	3.07749-05
2.4207000-01	-2.2581071-04	-1.2735144-04	-2.8586136-03	4.96955-04	2.0616171-05	-1.5002649-06	4.6671204-04	1.27435-05
2.4907000-01	-2.0985735-04	-1.2290344-04	-2.5123208-03	4.88575-04	2.0128823-05	1.9112059-06	4.6916190-04	-5.79515-06

REGION NUMBER 8

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 SPHERE

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
2.4907000-01	-2.0986757-04	-1.2290157-04	-2.5122873-03	4.08593-04	2.0128831-05	1.9111567-06	4.6916108-04	-5.79575-06
2.5907000-01	-1.8702913-04	-1.1250026-04	-2.0340410-03	4.63044-04	1.8884034-05	5.7179755-06	4.4991878-04	-3.15756-05
2.6907000-01	-1.6439344-04	-9.8553519-05	-1.5885438-03	4.23766-04	1.7284408-05	8.0174423-06	4.0803614-04	-5.09572-05
2.7907000-01	-1.4215932-04	-8.2513224-05	-1.1881876-03	3.73573-04	1.5413338-05	8.8704928-06	3.5005704-04	-6.37229-05
2.8907000-01	-1.2045639-04	-6.5842806-05	-8.4231414-04	3.15695-04	1.3353864-05	8.4979769-06	2.8261010-04	-6.99178-05
2.9907000-01	-9.9335926-05	-4.9833650-05	-5.5688114-04	2.53613-04	1.1180195-05	7.2388991-06	2.1214765-04	-6.98409-05
3.0907000-01	-7.8777332-05	-3.5475052-05	-3.3429702-04	1.90895-04	8.9513485-06	5.4938383-06	1.4470124-04	-6.40224-05
3.1907000-01	-5.8699899-05	-2.3356097-05	-1.7341656-04	1.31041-04	6.7073189-06	3.6578417-06	8.5666240-05	-5.31902-05
3.2907000-01	-3.8978869-05	-1.3624962-05	-6.9682467-05	7.73474-05	4.4681106-06	2.0489226-06	3.9624274-05	-3.82297-05
3.3907000-01	-1.9464198-05	-6.0224813-06	-1.5389395-05	3.27986-05	2.2358519-06	8.3969345-07	1.0208143-05	-2.01408-05
3.4907000-01	1.7968705-10	-2.2747881-09	-4.2159723-08	-1.30143-08	-2.1672501-11	5.2565994-10	1.0038850-08	3.26943-09

HARMONIC (N) = 3

ESTIMATE 1

EIGENVALUES

1.760510-01	2.421571+00	1.014718+01	3.104420+01	6.788608+01	7.949777+01	1.415846+02	1.673842+02
2.640101+02	3.327743+02	3.925809+02	5.502228+02	6.951530+02	8.628535+02	1.084556+03	1.285798+03
1.772041+03	2.231954+03	2.712618+03	3.464355+03	5.123178+03	5.381687+03	7.494456+03	1.038038+04
1.306090+04	2.495043+04	2.553479+04	7.096420+04				

THE CURRENT LOAD MULTIPLICATION FACTOR = 1.760510-01

THE CURRENT FREQUENCY = 1.168952+03 RADIANS/SECOND

HARMONIC (N) = 3

ESTIMATE 2

EIGENVALUES

1.004899+00	1.385165+01	5.808306+01	1.775187+02	3.865528+02	4.524105+02	8.052974+02	9.524597+02
1.500682+03	1.892690+03	2.231326+03	3.126524+03	3.950666+03	5.016898+03	6.161574+03	7.305173+03
1.006811+04	1.268033+04	1.540830+04	1.933358+04	2.911116+04	3.057312+04	4.256122+04	5.902150+04
7.418831+04	1.418117+05	1.447436+05	4.030859+05				

EIGENVECTOR 1

-2.078088-06	4.859491-06	1.960675-06	-8.926894-06	-8.268208-06	4.411071-05	9.605655-06	-3.267116-05
-1.781363-05	1.407943-04	2.440140-05	-6.544675-05	-3.603763-05	4.083818-04	6.417970-05	-1.417902-04
-5.964299-05	8.884283-04	1.442708-04	-1.248873-04	-7.485551-05	1.315852-03	2.384629-04	-3.264014-05
-5.537800-05	9.103076-04	1.956095-04	1.275225-04				

EIGENVECTOR 2

-6.972592-07	3.774029-06	6.948595-07	-6.869637-06	-2.662929-06	3.308743-05	3.714383-06	-2.365238-05
-5.285173-06	9.939776-05	1.002486-05	-4.234849-05	-8.650671-06	2.486971-04	2.587887-05	-5.217956-05
-8.331104-06	3.851856-04	4.393842-05	-7.939509-06	1.044715-06	1.924984-04	1.600616-05	7.900071-05
1.182275-05	-2.904880-04	-7.355512-05	2.234307-05				

THE CURRENT LOAD MULTIPLICATION FACTOR = 1.769136-01

THE CURRENT FREQUENCY = 1.171812+03 RADIANS/SECOND

REGION NUMBER 1

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 SPHERE

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
1.0000000-02	0.0000000	0.0000000	0.0000000	0.00000	0.0000000	0.0000000	0.0000000	0.00000
1.1000000-02	-2.7748587-07	1.2755174-07	-7.7309195-08	-1.46091-06	-9.3076845-08	4.3331654-08	-6.0206977-08	-1.13799-06
1.2000000-02	-5.0972729-07	2.8256169-07	-2.8021456-07	-2.54955-06	-1.6945576-07	9.5637948-08	-2.1811090-07	-1.98452-06
1.3000000-02	-7.0659217-07	4.5297962-07	-5.8146431-07	-3.44584-06	-2.3739208-07	1.5290951-07	-4.5232676-07	-2.67972-06
1.4000000-02	-8.9682299-07	6.3342718-07	-9.6714615-07	-4.24642-06	-3.0143817-07	2.1334096-07	-7.5185685-07	-3.29874-06
1.5000000-02	-1.0833703-06	8.2158113-07	-1.4306566-06	-5.00544-06	-3.6421778-07	2.7613339-07	-1.1113822-06	-3.88358-06
1.6000000-02	-1.2710138-06	1.0165421-06	-1.9695525-06	-5.75425-06	-4.2729808-07	3.4099462-07	-1.5288035-06	-4.45842-06
1.7000000-02	-1.4627210-06	1.2180711-06	-2.5838321-06	-6.51153-06	-4.9164164-07	4.0768673-07	-2.0038980-06	-5.03753-06
1.8000000-02	-1.6603837-06	1.4262226-06	-3.2749593-06	-7.28856-06	-5.5785164-07	4.7630502-07	-2.5375558-06	-5.62941-06
1.9000000-02	-1.8652340-06	1.6411660-06	-4.0452907-06	-8.09227-06	-6.2631018-07	5.4681919-07	-3.1343307-06	-6.23913-06
2.0000000-02	-2.0780873-06	1.8630995-06	-4.8977303-06	-8.92689-06	-6.9725915-07	6.1924501-07	-3.7871703-06	-6.86964-06

REGION NUMBER 2

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 SPHERE

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
2.0000000-02	-2.0780876-06	1.8630996-06	-4.8977302-06	-8.92689-06	-6.9725924-07	6.1924503-07	-3.7871702-06	-6.86964-06
2.2000000-02	-2.5297991-06	2.3286449-06	-6.8620761-06	-1.06980-05	-8.4691557-07	7.6974148-07	-5.2935850-06	-8.19642-06
2.4000000-02	-3.0180494-06	2.8239589-06	-9.1957446-06	-1.26112-05	-1.0076092-06	9.2778431-07	-7.0751589-06	-9.61804-06
2.6000000-02	-3.5439001-06	3.3495648-06	-1.1927432-05	-1.46677-05	-1.1796219-06	1.0930532-06	-9.1506572-06	-1.11316-05
2.8000000-02	-4.1076702-06	3.9054705-06	-1.5085626-05	-1.68648-05	-1.3624948-06	1.2650108-06	-1.1537935-05	-1.27313-05
3.0000000-02	-4.7092696-06	4.4912649-06	-1.8698041-05	-1.91976-05	-1.5559358-06	1.4429411-06	-1.4253480-05	-1.44095-05
3.2000000-02	-5.3483628-06	5.1062025-06	-2.2791314-05	-2.16603-05	-1.7594726-06	1.6259826-06	-1.7312152-05	-1.61575-05
3.4000000-02	-6.0244540-06	5.7492692-06	-2.7390830-05	-2.42463-05	-1.9725614-06	1.8131551-06	-2.0727003-05	-1.79659-05
3.6000000-02	-6.7369340-06	6.4192311-06	-3.2520999-05	-2.69485-05	-2.1946029-06	2.0033792-06	-2.4509151-05	-1.98249-05
3.8000000-02	-7.4851066-06	7.1146702-06	-3.8203170-05	-2.97594-05	-2.4249527-06	2.1954933-06	-2.8667672-05	-2.17241-05
4.0000000-02	-8.2682042-06	7.8340120-06	-4.4459557-05	-3.26712-05	-2.6629278-06	2.3802666-06	-3.3209506-05	-2.36524-05

REGION NUMBER 3

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 SPHERE

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMLGA THETA	U	V	W	OMEGA THET
4.0000000-02	-8.2602684-06	7.8340139-06	-4.4459551-05	-3.26712-05	-2.6629289-06	2.3882672-06	-3.3209600-05	-2.36524-05
4.2000000-02	-9.0854023-06	8.5755476-06	-5.1309170-05	-3.56757-05	-2.9068346-06	2.5800081-06	-3.8188589-05	-2.55929-05
4.4000000-02	-9.9358102-06	9.3374417-06	-5.8769794-05	-3.87648-05	-3.1570199-06	2.7697371-06	-4.3458184-05	-2.75515-05
4.6000000-02	-1.0818499-05	1.0117758-05	-6.6857495-05	-4.19296-05	-3.4126818-06	2.9560975-06	-4.9170606-05	-2.95153-05
4.8000000-02	-1.1732488-05	1.0914461-05	-7.5586603-05	-4.51616-05	-3.6730023-06	3.1376924-06	-5.5275636-05	-3.14718-05
5.0000000-02	-1.2676754-05	1.1725430-05	-8.4969663-05	-4.84516-05	-3.9371478-06	3.3130961-06	-6.1770532-05	-3.34083-05
5.2000000-02	-1.3650233-05	1.2548462-05	-9.5017401-05	-5.17905-05	-4.2042706-06	3.4806639-06	-6.8650033-05	-3.53123-05
5.4000000-02	-1.4651819-05	1.3381288-05	-1.0573869-04	-5.51689-05	-4.4735100-06	3.6395413-06	-7.5906344-05	-3.71710-05
5.6000000-02	-1.5680367-05	1.4221573-05	-1.1714051-04	-5.85775-05	-4.7439943-06	3.7876734-06	-8.3529136-05	-3.89719-05
5.8000000-02	-1.6734706-05	1.5066923-05	-1.2922797-04	-6.20067-05	-5.0148433-06	3.9238140-06	-9.1505522-05	-4.07020-05
6.0000000-02	-1.7813616-05	1.5914898-05	-1.4200420-04	-6.54466-05	-5.2851704-06	4.0465343-06	-9.9820049-05	-4.23486-05

REGION NUMBER 4

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 SPHERE

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
6.0000000-02	-1.7813626-05	1.5914902-05	-1.4200416-04	-6.54467-05	-5.2851735-06	4.0465855-06	-9.9820013-05	-4.23485-05
6.3000000-02	-1.9475383-05	1.7186390-05	-1.6246207-04	-7.06060-05	-5.6833600-06	4.2009231-06	-1.1287255-04	-4.45652-05
6.6000000-02	-2.1185301-05	1.8449663-05	-1.8448788-04	-7.57351-05	-6.0758018-06	4.3172856-06	-1.2858907-04	-4.66299-05
6.9000000-02	-2.2938906-05	1.9696052-05	-2.0800749-04	-8.08010-05	-6.4593930-06	4.3913399-06	-1.4085599-04	-4.84911-05
7.2000000-02	-2.4731595-05	2.0916806-05	-2.3305699-04	-8.57708-05	-6.8310890-06	4.4189719-06	-1.5566491-04	-5.01013-05
7.5000000-02	-2.6558647-05	2.2103136-05	-2.5958258-04	-9.06120-05	-7.1879095-06	4.3963239-06	-1.7091368-04	-5.14162-05
7.8000000-02	-2.8415237-05	2.3246277-05	-2.8754070-04	-9.52925-05	-7.5269487-06	4.3190742-06	-1.8650728-04	-5.23944-05
8.1000000-02	-3.0296448-05	2.4337529-05	-3.1687827-04	-9.97808-05	-7.8453892-06	4.1865131-06	-2.0233854-04	-5.29963-05
8.4000000-02	-3.2197289-05	2.5368319-05	-3.4753285-04	-1.04046-04	-8.1405200-06	3.9936174-06	-2.1828874-04	-5.31845-05
8.7000000-02	-3.4112703-05	2.6330249-05	-3.7943293-04	-1.08059-04	-8.4097559-06	3.7391220-06	-2.3422824-04	-5.29237-05
8.9700000-02	-3.5844820-05	2.7130355-05	-4.0914174-04	-1.11432-04	-8.6279094-06	3.4562074-06	-2.4844917-04	-5.22774-05
9.0000000-02	-3.6037588-05	2.7215152-05	-4.1249824-04	-1.11791-04	-8.6506586-06	3.4215909-06	-2.5001708-04	-5.21804-05

REGION NUMBER 5

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 SPHERE

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
9.0000000-02	-3.6037630-05	2.7215178-05	-4.1249739-04	-1.11790-04	-8.6506708-06	3.4216998-06	-2.5001649-04	-5.21796-05
9.3907000-02	-3.8550442-05	2.8239394-05	-4.5715836-04	-1.16183-04	-8.9050211-06	2.9095266-06	-2.7004735-04	-5.02415-05
9.7814000-02	-4.1059238-05	2.9103130-05	-5.0342828-04	-1.19998-04	-9.1038637-06	2.2896698-06	-2.8924860-04	-4.79266-05
1.0172100-01	-4.3552630-05	2.9791011-05	-5.5107028-04	-1.23183-04	-9.2430411-06	1.5637006-06	-3.0745359-04	-4.51412-05
1.0562800-01	-4.6019280-05	3.0289020-05	-5.9982826-04	-1.25692-04	-9.3190326-06	7.3464224-07	-3.2446297-04	-4.18109-05
1.0953500-01	-4.8447957-05	3.0584671-05	-6.4942899-04	-1.27483-04	-9.3289367-06	-1.9285625-07	-3.4005161-04	-3.78773-05
1.1344200-01	-5.0827588-05	3.0667175-05	-6.9958446-04	-1.28523-04	-9.2704788-06	-1.2122958-06	-3.5397418-04	-3.32951-05
1.1734900-01	-5.3147317-05	3.0527695-05	-7.4999425-04	-1.28782-04	-9.1420352-06	-2.3151403-06	-3.6596983-04	-2.80300-05
1.2125600-01	-5.5396553-05	3.0159299-05	-8.0034816-04	-1.28239-04	-8.9426673-06	-3.4906600-06	-3.7576657-04	-2.20583-05
1.2516300-01	-5.7565027-05	2.9557294-05	-8.5032883-04	-1.26879-04	-8.6721603-06	-4.7258047-06	-3.8308480-04	-1.53649-05
1.2907000-01	-5.9642845-05	2.8719242-05	-8.9961450-04	-1.24695-04	-8.3310672-06	-6.0051007-06	-3.8764089-04	-7.94358-06

REGION NUMBER 6

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 SPHERE

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
~~1.2907000-01~~	~~-5.9642990-05~~	~~2.8719398-05~~	~~-8.9960772-04~~	~~-1.24687-04~~	~~-8.3311044-06~~	~~-6.0050365-06~~	~~-3.8783698-04~~	~~-7.93951-06~~
1.3407000-01	-6.2155899-05	2.7303485-05	-9.6114666-04	-1.20684-04	-7.7699551-06	-7.6751709-06	-3.8893231-04	2.54234-06
~~1.3907000-01~~	~~-6.4408273-05~~	~~2.5508898-05~~	~~-1.0203421-03~~	~~-1.15349-04~~	~~-7.1003034-06~~	~~-9.3488890-06~~	~~-3.8508966-04~~	~~1.25920-05~~
1.4407000-01	-6.6616864-05	2.3342026-05	-1.0765345-03	-1.08719-04	-6.3288296-06	-1.0989382-05	-3.7630901-04	2.22676-05
~~1.4907000-01~~	~~-6.8532016-05~~	~~2.0827980-05~~	~~-1.1290869-03~~	~~-1.00847-04~~	~~-5.4639978-06~~	~~-1.2560103-05~~	~~-3.6277058-04~~	~~3.15926-05~~
1.5407000-01	-7.0217799-05	1.7990496-05	-1.1773938-03	-9.18040-05	-4.5157805-06	-1.4024769-05	-3.4464975-04	4.05645-05
~~1.5907000-01~~	~~-7.1662145-05~~	~~1.4861714-05~~	~~-1.2208900-03~~	~~-8.16799-05~~	~~-3.4954516-06~~	~~-1.5347535-05~~	~~-3.2212838-04~~	~~4.91621-05~~
1.6407000-01	-7.2854966-05	1.1479813-05	-1.2590590-03	-7.05791-05	-2.4154197-06	-1.6493288-05	-2.9540266-04	5.73504-05
~~1.6907000-01~~	~~-7.3788254-05~~	~~7.8805136-06~~	~~-1.2914408-03~~	~~-5.86208-05~~	~~-1.2890813-06~~	~~-1.7924035-05~~	~~-2.6480895-04~~	~~6.50852-05~~
1.7407000-01	-7.4456164-05	4.1364325-06	-1.3176374-03	-4.59367-05	-1.3068828-07	-1.8119361-05	-2.3022753-04	7.23162-05
~~1.7857000-01~~	~~-7.4827348-05~~	~~6.6981494-07~~	~~-1.3356538-03~~	~~-3.40180-05~~	~~4.2691030-07~~	~~-1.8508297-05~~	~~-1.9622759-04~~	~~7.83495-05~~
1.7907000-01	-7.4855078-05	2.7631706-07	-1.3373212-03	-3.26692-05	1.0447870-06	-1.8536919-05	-1.9228482-04	7.89903-05

REGION NUMBER 7

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1   SEGMENT CODE 11   SPHERE

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
1.7907000-01	-7.4865507-05	2.7746319-07	-1.3372849-03	-3.26481-05	1.0447147-06	-1.8536532-05	-1.9227119-04	7.90007-05
1.8607000-01	-7.4964874-05	-5.1997129-06	-1.3534053-03	-1.33638-05	2.6754037-06	-1.8592880-05	-1.3482644-04	8.43322-05
1.9307000-01	-7.4548898-05	-1.0618233-05	-1.3558279-03	6.31337-06	4.2748320-06	-1.8072865-05	-7.4542783-05	8.71115-05
2.0007000-01	-7.3620122-05	-1.5815580-05	-1.3444293-03	2.59442-05	5.8010929-06	-1.6984346-05	-1.3218758-05	8.73198-05
2.0707000-01	-7.2199404-05	-2.0633291-05	-1.3194007-03	4.50814-05	7.2153516-06	-1.5362490-05	4.7343637-05	8.49670-05
2.1407000-01	-7.0315380-05	-2.4923642-05	-1.2812446-03	6.32896-05	8.4829728-06	-1.3270026-05	1.0536158-04	8.00979-05
2.2107000-01	-6.8003686-05	-2.8556256-05	-1.2307609-03	8.01575-05	9.5745594-06	-1.0796479-05	1.5909780-04	7.27967-05
2.2807000-01	-6.5305972-05	-3.1424268-05	-1.1690270-03	9.53090-05	1.0466872-05	-8.0562659-06	2.0688876-04	6.31879-05
2.3507000-01	-6.2260684-05	-3.3449726-05	-1.0973686-03	1.08413-04	1.1143593-05	-5.1856011-06	2.4717293-04	5.14357-05
2.4207000-01	-5.8941678-05	-3.4567849-05	-1.0173256-03	1.19192-04	1.1595896-05	-2.3381942-06	2.7851800-04	3.77415-05
2.4907000-01	-5.5376679-05	-3.4829869-05	-9.3061201-04	1.27427-04	1.1822767-05	3.2018146-07	2.9964566-04	2.23401-05

REGION NUMBER 8

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 SPHERE

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
2.4907000-01	-5.5378004-05	-3.4819923-05	-9.3043572-04	1.27522-04	1.1822749-05	3.2072603-07	2.9965565-04	2.23431-05
2.5907000-01	-4.9980434-05	-3.3671644-05	-7.9856968-04	1.34586-04	1.1519354-05	3.5291461-06	3.0867398-04	-3.39275-06
2.6907000-01	-4.4347115-05	-3.0964773-05	-6.6248888-04	1.35784-04	1.0853673-05	5.6231975-06	2.9459642-04	-2.37524-05
2.7907000-01	-3.8607174-05	-2.7037419-05	-5.2785457-04	1.31787-04	9.8904356-06	6.5807703-06	2.6292166-04	-3.85332-05
2.8907000-01	-3.2864490-05	-2.2323049-05	-4.0012743-04	1.22339-04	8.7050986-06	6.5231405-06	2.1928583-04	-4.76673-05
2.9907000-01	-2.7193302-05	-1.7300968-05	-2.8429016-04	1.08222-04	7.3716021-06	5.6869325-06	1.6931305-04	-5.12454-05
3.0907000-01	-2.1629041-05	-1.2436837-05	-1.8463278-04	9.02249-05	5.9526073-06	4.3821880-06	1.1885134-04	-4.95234-05
3.1907000-01	-1.6172580-05	-8.1193238-06	-1.0456745-04	6.92991-05	4.4926762-06	2.9380320-06	7.1808938-05	-4.29166-05
3.2907000-01	-1.0790864-05	-4.8003967-06	-4.6491756-05	4.65087-05	3.0149395-06	1.6398727-06	3.4002429-05	-3.19834-05
3.3907000-01	-5.4245303-06	-1.9477105-06	-1.1699267-05	2.29865-05	1.5217549-06	6.6262189-07	9.0249373-06	-1.74035-05
3.4907000-01	1.2463218-09	-1.7808003-08	-3.3472619-07	-1.08329-07	-3.1398459-10	7.1866395-09	1.3870283-07	-4.69272-08

HARMONIC (N) = 4

ESTIMATE 1

EIGENVALUES

6.746230-01	4.620846+00	1.693299+01	4.702663+01	9.880335+01	1.154592+02	2.107212+02	2.415869+02
3.599988+02	4.449784+02	5.497019+02	7.326541+02	9.489771+02	1.164535+03	1.438276+03	1.701017+03
2.271648+03	2.937199+03	3.401871+03	4.503538+03	7.074127+03	7.176183+03	1.014234+04	1.316028+04
1.612565+04	2.952645+04	3.831490+04	8.922242+04				

THE CURRENT LOAD MULTIPLICATION FACTOR = 6.746230-01

THE CURRENT FREQUENCY = 2.288274+03 RADIANS/SECOND

HARMONIC (N) = 4

ESTIMATE 2

```
EIGENVALUES
   1.002478+00   6.869580+00   2.517356+01   6.987130+01   1.465873+02   1.712199+02   3.124949+02   3.583219+02
   5.337621+02   6.598166+02   8.150064+02   1.086161+03   1.406954+03   1.726405+03   2.132040+03   2.521971+03
   3.367416+03   4.354100+03   5.131443+03   6.675723+03   1.048446+04   1.063721+04   1.503374+04   1.951188+04
   2.390598+04   4.378357+04   5.678049+04   1.323332+05

EIGENVECTOR    1
  -1.026111-07   2.837949-07   1.038010-07  -6.103794-07  -7.993202-07   4.607949-06   9.510467-07  -4.519552-06
  -2.573083-06   2.180991-05   3.642368-06  -1.373322-05  -7.743932-06   9.420703-05   1.453224-05  -3.614929-05
  -1.805396-05   2.913062-04   4.716761-05  -6.305234-05  -3.021875-05   5.916478-04   1.081411-04  -4.700594-05
  -2.786372-05   5.643138-04   1.235477-04   5.579982-05

EIGENVECTOR    2
  -7.706980-08   4.184266-07   8.158554-08  -8.931449-07  -5.779292-07   6.570358-06   7.992003-07  -6.278464-06
  -1.734694-06   2.135489-05   3.199558-06  -1.739588-05  -4.390466-06   1.104335-04   1.242989-05  -3.582209-05
  -6.860545-06   2.517779-04   3.179304-05  -2.824963-05  -3.013875-06   2.249797-04   2.958718-05   4.376803-05
   7.217736-06  -1.845186-04  -4.765896-05   3.571926-05

    THE CURRENT LOAD MULTIPLICATION FACTOR =   6.762950-01

    THE CURRENT FREQUENCY =   2.291108+03 RADIANS/SECOND
```

REGION NUMBER 1

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 SPHERE

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
1.0000000-02	0.0000000	0.0000000	0.0000000	0.00000	0.0000000	0.0000000	0.0000000	0.00000
1.1000000-02	-9.9012690-09	4.9630053-09	-3.9162621-09	-7.33016-08	-7.4416056-09	3.7753219-09	-5.7929053-09	-1.08440-07
1.2000000-02	-1.8090223-08	1.1377446-08	-1.4026038-08	-1.28601-07	-1.3611564-08	8.6202873-09	-2.0730141-08	-1.87464-07
1.3000000-02	-2.5867347-08	1.8761250-08	-2.9079499-08	-1.73498-07	-1.9477802-08	1.4193106-08	-4.2973280-08	-2.56291-07
1.4000000-02	-3.3913786-08	2.7056167-08	-4.8754020-08	-2.19817-07	-2.5548485-08	2.0405274-08	-7.2005425-08	-3.24393-07
1.5000000-02	-4.2619656-08	3.6218616-08	-7.3199960-08	-2.69169-07	-3.2106478-08	2.7266755-08	-1.0803777-07	-3.96773-07
1.6000000-02	-5.2230501-08	4.6336603-08	-1.0282756-07	-3.23508-07	-3.9338405-08	3.4824537-08	-1.5165320-07	-4.76272-07
1.7000000-02	-6.2916512-08	5.7495814-08	-1.3820197-07	-3.84057-07	-4.7366179-08	4.3137573-08	-2.0365810-07	-5.64636-07
1.8000000-02	-7.4808887-08	6.9785713-08	-1.7998942-07	-4.51653-07	-5.6262567-08	5.2266512-08	-2.6500171-07	-6.63034-07
1.9000000-02	-8.8007628-08	8.3294023-08	-2.2892843-07	-5.26923-07	-6.6162426-08	6.2269607-08	-3.3673267-07	-7.72315-07
2.0000000-02	-1.0261109-07	9.8104736-08	-2.8581402-07	-6.10379-07	-7.7069775-08	7.3201237-08	-4.1997468-07	-8.93145-07

REGION NUMBER 2

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 SPHERE

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
2.0000000-02	-1.0261112-07	9.8104746-08	-2.8581400-07	-6.10379-07	-7.7069798-08	7.3201244-08	-4.1997457-07	-8.93145-07
2.2000000-02	-1.3635676-07	1.3194728-07	-4.2683644-07	-8.03571-07	-1.0214165-07	9.8021810-08	-6.2572163-07	-1.17109-06
2.4000000-02	-1.7666198-07	1.7170423-07	-6.1027907-07	-1.03432-06	-1.3196248-07	1.2709672-07	-8.9229898-07	-1.50143-06
2.6000000-02	-2.2409968-07	2.1850814-07	-8.4394615-07	-1.30539-06	-1.6688744-07	1.6071683-07	-1.2304897-06	-1.88704-06
2.8000000-02	-2.7921619-07	2.7224208-07	-1.1361690-06	-1.61928-06	-2.0724123-07	1.9911357-07	-1.6516074-06	-2.33035-06
3.0000000-02	-3.4253746-07	3.3354457-07	-1.4957658-06	-1.97835-06	-2.5332031-07	2.4246263-07	-2.1674085-06	-2.83334-06
3.2000000-02	-4.1457091-07	4.0281219-07	-1.9320043-06	-2.38474-06	-3.0539280-07	2.9088524-07	-2.7899998-06	-3.39754-06
3.4000000-02	-4.9580568-07	4.8040032-07	-2.4545639-06	-2.84041-06	-3.6369752-07	3.4444821-07	-3.5317419-06	-4.02396-06
3.6000000-02	-5.8671196-07	5.6662304-07	-3.0734965-06	-3.34711-06	-4.2844281-07	4.0316331-07	-4.4051451-06	-4.71307-06
3.8000000-02	-6.8774010-07	6.6175231-07	-3.7991842-06	-3.90638-06	-4.9980532-07	4.6698639-07	-5.4227605-06	-5.46479-06
4.0000000-02	-7.9931970-07	7.6601688-07	-4.6422963-06	-4.51956-06	-5.7792880-07	5.3581653-07	-6.5970649-06	-6.27847-06

REGION NUMBER 3

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 SPHERE

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
4.0000000-02	-7.9932020-07	7.6601717-07	-4.6422946-06	-4.51955-06	-5.7792919-07	6.3581675-07	-6.5970621-06	-6.27846-06
4.2000000-02	-9.2185869-07	8.7960159-07	-5.6137405-06	-5.18771-06	-6.6256594-07	6.0934072-07	-7.9399576-06	-7.14980-06
4.4000000-02	-1.0557413-06	1.0026441-06	-6.7246260-06	-5.91170-06	-7.5419552-07	6.8747043-07	-9.4636378-06	-8.08434-06
4.6000000-02	-1.2013289-06	1.1352359-06	-7.9862020-06	-6.69214-06	-8.5284044-07	7.6993970-07	-1.1180472-05	-9.07924-06
4.8000000-02	-1.3589578-06	1.2774200-06	-9.4098167-06	-7.52938-06	-9.5849209-07	8.5641911-07	-1.3102224-05	-1.01313-05
5.0000000-02	-1.5289385-06	1.4291898-06	-1.1006864-05	-8.42352-06	-1.0711084-06	9.4651789-07	-1.5239968-05	-1.12367-05
5.2000000-02	-1.7115548-06	1.5964880-06	-1.2788732-05	-9.37441-06	-1.1906122-06	1.0397856-06	-1.7603979-05	-1.23914-05
5.4000000-02	-1.9070634-06	1.7612060-06	-1.4766752-05	-1.03816-05	-1.3168902-06	1.1357141-06	-2.0203628-05	-1.35903-05
5.6000000-02	-2.1156926-06	1.9411825-06	-1.6952147-05	-1.14445-05	-1.4497931-06	1.2337396-06	-2.3647256-05	-1.48282-05
5.8000000-02	-2.3376418-06	2.1302038-06	-1.9355978-05	-1.25621-05	-1.5891346-06	1.3332449-06	-2.6142054-05	-1.60990-05
6.0000000-02	-2.5730811-06	2.3280026-06	-2.1989691-05	-1.37332-05	-1.7346925-06	1.4335629-06	-2.9493937-05	-1.73959-05

REGION NUMBER 4

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 SPHERE

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
6.0000000-02	-2.5730831-06	2.3260038-06	-2.1989079-05	-1.37332-05	-1.7346940-06	1.4335637-06	-2.9493920-05	-1.73959-05
6.3000000-02	-2.9518437-06	2.6404544-06	-2.6391697-05	-1.55870-05	-1.9616345-06	1.5830538-06	-3.5004488-05	-1.93268-05
6.6000000-02	-3.3616099-06	2.9706153-06	-3.1368234-05	-1.75518-05	-2.2012309-06	1.7300494-06	-4.1107125-05	-2.13340-05
6.9000000-02	-3.8025666-06	3.3169087-06	-3.6951008-05	-1.96205-05	-2.4521916-06	1.8718249-06	-4.7819390-05	-2.33823-05
7.2000000-02	-4.2747376-06	3.6774906-06	-4.3169960-05	-2.17644-05	-2.7130912-06	2.0054190-06	-5.5148372-05	-2.54369-05
7.5000000-02	-4.7779836-06	4.0502566-06	-5.0052291-05	-2.40339-05	-2.9823642-06	2.1276912-06	-6.3090665-05	-2.74625-05
7.8000000-02	-5.3120004-06	4.4328505-06	-5.7622108-05	-2.63582-05	-3.2583067-06	2.2353769-06	-7.1632097-05	-2.94227-05
8.1000000-02	-5.8763187-06	4.8226744-06	-6.5900094-05	-2.87453-05	-3.5390854-06	2.3251456-06	-8.0747321-05	-3.12793-05
8.4000000-02	-6.4703041-06	5.2169024-06	-7.4903200-05	-3.11822-05	-3.8227502-06	2.3936616-06	-9.0399320-05	-3.29928-05
8.7000000-02	-7.0931576-06	5.6124956-06	-8.4644349-05	-3.36553-05	-4.1072506-06	2.4376509-06	-1.0053890-04	-3.45217-05
8.9700000-02	-7.6776165-06	5.9670278-06	-9.4049648-05	-3.58498-05	-4.3622582-06	2.4536708-06	-1.1003050-04	-3.57041-05
9.0000000-02	-7.7439175-06	6.0062203-06	-9.5132186-05	-3.61497-05	-4.3904565-06	2.4539724-06	-1.1110414-04	-3.58227-05

REGION NUMBER 6

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 SPHERE

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
9.0000000-02	-7.7439315-06	6.0062300-06	-9.5131885-05	-3.61493-05	-4.3904658-06	2.4539796-06	-1.1110375-04	-3.58221-05
9.3907000-02	-8.6314806-06	6.5106202-06	-1.0991592-04	-3.94041-05	-4.7421616-06	2.4256368-06	-1.2531274-04	-3.68608-05
9.7814000-02	-9.5615759-06	6.9981551-06	-1.2596981-04	-4.26337-05	-5.0840034-06	2.3396276-06	-1.3991271-04	-3.78008-05
1.0172100-01	-1.0530904-05	7.4605849-06	-1.4327647-04	-4.58013-05	-5.4107477-06	2.1907292-06	-1.5483824-04	-3.85091-05
1.0862800-01	-1.1535731-05	7.8894176-06	-1.6180418-04	-4.88690-05	-5.7172432-06	1.9740982-06	-1.6997527-04	-3.88687-05
1.0953500-01	-1.2571921-05	8.2760321-06	-1.8150626-04	-5.17984-05	-5.9984272-06	1.6856590-06	-1.8516632-04	-3.87738-05
1.1344200-01	-1.3634963-05	8.6117969-06	-2.0232105-04	-5.45513-05	-6.2493638-06	1.3224621-06	-2.0021421-04	-3.81266-05
1.1734900-01	-1.4719997-05	8.8861974-06	-2.2417191-04	-5.70897-05	-6.4653084-06	8.8302883-07	-2.1488477-04	-3.68354-05
1.2125600-01	-1.5821844-05	9.0989871-06	-2.4696755-04	-5.93767-05	-6.6417931-06	3.6769017-07	-2.2890901-04	-3.48136-05
1.2516300-01	-1.6935043-05	9.2302232-06	-2.7060248-04	-6.13768-05	-6.7747256-06	-2.2107541-07	-2.4198501-04	-3.19790-05
1.2907000-01	-1.8053883-05	9.2806029-06	-2.9495762-04	-6.30562-05	-6.8605012-06	-8.7830385-07	-2.5377959-04	-2.82538-05

REGION NUMBER 6

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 SPHERE

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
1.2907000-01	-1.8053956-05	9.2806845-06	-2.9495416-04	-6.30523-05	-6.8606452-06	-8.7823537-07	-2.5377675-04	-2.82496-05
1.3407000-01	-1.9485051-05	9.2140566-06	-3.2695895-04	-6.46607-05	-6.8624893-06	-1.8085257-06	-2.6625273-04	-2.17446-05
1.3907000-01	-2.0902954-05	8.9887512-06	-3.5962109-04	-6.56754-05	-6.7787444-06	-2.8172709-06	-2.7553851-04	-1.54607-05
1.4407000-01	-2.2294602-05	8.5952154-06	-3.9260983-04	-6.59856-05	-6.6061235-06	-3.8858197-06	-2.8168441-04	-9.17424-06
1.4907000-01	-2.3646801-05	8.0268672-06	-4.2557147-04	-6.55707-05	-6.3433481-06	-4.9938297-06	-2.8464618-04	-2.72335-06
1.5407000-01	-2.4946384-05	7.2804624-06	-4.5813463-04	-6.44008-05	-5.9908466-06	-6.1184467-06	-2.8431102-04	4.00698-06
1.5907000-01	-2.6180392-05	6.3564009-06	-4.8991584-04	-6.24577-05	-5.5506841-06	-7.2337406-06	-2.8051811-04	1.10959-05
1.6407000-01	-2.7336244-05	5.2589643-06	-5.2052564-04	-5.97355-05	-5.0265738-06	-8.3103340-06	-2.7307441-04	1.85946-05
1.6907000-01	-2.8401916-05	3.9964690-06	-5.4957485-04	-5.62411-05	-4.4239329-06	-9.3151815-06	-2.6176728-04	2.65320-05
1.7407000-01	-2.9366112-05	2.5813276-06	-5.7668098-04	-5.19943-05	-3.7499629-06	-1.0211475-05	-2.4637439-04	3.49191-05
1.7857000-01	-3.0138516-05	1.1907157-06	-5.9910953-04	-4.75555-05	-3.0898624-06	-1.0891882-05	-2.2884242-04	4.28491-05
1.7907000-01	-3.0218439-05	1.0300069-06	-6.0147469-04	-4.70276-05	-3.0137371-06	-1.0958658-05	-2.2667195-04	4.37522-05

REGION NUMBER 7

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1   SEGMENT CODE 11   SPHERE

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
1.7907000-01	-3.0218749-05	1.0308349-06	-6.6144872-04	-4.70059-05	-3.0138753-06	-1.0958078-05	-2.2665214-04	4.37680-05
1.8607000-01	-3.1209467-05	-1.3286148-06	-6.3159355-04	-3.69183-05	-1.8739298-06	-1.1656316-05	-1.9229230-04	5.37587-05
1.9307000-01	-3.1941623-05	-3.8464805-06	-6.5564659-04	-2.96803-05	-6.6025176-07	-1.1946136-05	-1.5180073-04	6.12910-05
2.0007000-01	-3.2399184-05	-6.4434765-06	-6.7287060-04	-1.94951-05	5.8854777-07	-1.1795340-05	-1.0688012-04	6.64157-05
2.0707000-01	-3.2572034-05	-9.0315831-06	-6.8268414-04	-8.60194-06	1.8325455-06	-1.1190808-05	-5.9214117-05	6.91422-05
2.1407000-01	-3.2456368-05	-1.1517755-05	-6.8468419-04	2.73166-06	3.0323106-06	-1.0149882-05	-1.0486427-05	6.94645-05
2.2107000-01	-3.2054877-05	-1.3808231-05	-6.7866341-04	1.42175-05	4.1505409-06	-8.7133735-06	3.7615778-05	6.73807-05
2.2807000-01	-3.1376705-05	-1.5813247-05	-6.6462145-04	2.55556-05	5.1535810-06	-6.9476407-06	8.3409650-05	6.29059-05
2.3507000-01	-3.0437153-05	-1.7451924-05	-6.4276988-04	3.64446-05	6.0128206-06	-4.9448999-06	1.2523207-04	5.60808-05
2.4207000-01	-2.9257124-05	-1.8657045-05	-6.1353073-04	4.65863-05	6.7059427-06	-2.8193801-06	1.6145987-04	4.69774-05
2.4907000-01	-2.7862313-05	-1.9379415-05	-5.7752864-04	5.57023-05	7.2179658-06	-7.0621955-07	1.9053256-04	3.57005-05

REGION NUMBER 8

THERE ARE 1 SEGMENTS AND 0 KINEMATIC LINKS WITHIN THIS REGION

SEGMENT NUMBER 1 SEGMENT CODE 11 SPHERE

	VECTOR 1				VECTOR 2			
PHI OR S	U	V	W	OMEGA THETA	U	V	W	OMEGA THET
2.4907000-01	-2.7863717-05	-1.9369611-06	-5.7735512-04	5.57998-05	7.2177359-06	-7.0396482-07	1.9057278-04	3.57193-05
2.5907000-01	-2.5562021-05	-1.9508682-05	-5.1573912-04	6.65510-05	7.3175277-06	2.0444201-06	2.1381458-04	1.15666-05
2.6907000-01	-2.2975687-05	-1.8614315-05	-4.4494701-04	7.40660-05	7.1062696-06	3.9337540-06	2.1523367-04	-7.68922-06
2.7907000-01	-2.0200005-05	-1.6797894-05	-3.6847735-04	7.78690-05	6.6216738-06	4.9109379-06	1.9953716-04	-2.26304-05
2.8907000-01	-1.7322537-05	-1.4269111-05	-2.9021200-04	7.76690-05	5.9221190-06	5.0430006-06	1.7145746-04	-3.26370-05
2.9907000-01	-1.4414108-05	-1.1313845-05	-2.1422366-04	7.33709-05	5.0719621-06	4.4990373-06	1.3574295-04	-3.79112-05
3.0907000-01	-1.1521144-05	-8.2577542-06	-1.4457917-04	6.50743-05	4.1295837-06	3.5206571-06	9.7096688-05	-3.85384-05
3.1907000-01	-8.6605190-06	-5.4177169-06	-8.5149589-05	5.30619-05	3.1384038-06	2.3802134-06	6.0084173-05	-3.47056-05
3.2907000-01	-5.8180121-06	-3.0449492-06	-3.9436939-05	3.77795-05	2.1214787-06	1.3280004-06	2.9026797-05	-2.67088-05
3.3907000-01	-2.9513422-06	-1.2653913-06	-1.0424717-05	1.98098-05	1.0804361-06	5.3137655-07	7.8940208-06	-1.49504-05
3.4907000-01	1.5958088-09	-2.3893761-08	-4.5636184-07	-1.55546-07	-4.8181563-10	1.0350497-08	2.0345094-07	7.24189-08

SECTION 5

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APPENDIX A

CONVERSION OF U.S. CUSTOMARY UNITS TO SI UNITS

The International System of Units (SI) was adopted by the Eleventh General Conference on Weights and Measures in 1960. Conversion factors for the units used in this report are given in the following table:

Physical quantity	U.S. Customary Unit	Conversion factor (*)	SI Unit (**)
Length	in.	0.0254	meters (m)
Stress modulus	ksi	6.895×10^6	newtons/mete (N/m^2)
Stress resultant	lbf/in.	175.1	newtons/mete (N/m)
Temperature change	°F	5/9	Kelvin (K)

* Multiply value given in U.S. Customary Unit by conversion factor to obtain equivalent value in SI Units.

** Prefixes to indicate multiple of units are as follows:

Prefix	Multiple
giga (G)	10^9
mega (M)	10^6
kilo (k)	10^3
deci (d)	10^{-1}
centi (c)	10^{-2}
milli (m)	10^{-3}

U.S. GOVERNMENT PRINTING OFFICE: 1973-739-152/19

"The aeronautical and space activities of the United States shall be conducted so as to contribute . . . to the expansion of human knowledge of phenomena in the atmosphere and space. The Administration shall provide for the widest practicable and appropriate dissemination of information concerning its activities and the results thereof."

—NATIONAL AERONAUTICS AND SPACE ACT OF 1958

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