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THE DYNAMIC BEHAVIOR OF  
ROTOR ENTRY VEHICLE CONFIGURATIONS  
II. DIGITAL COMPUTER PROGRAM MANUAL

By N. Giansante and R. F. Metzger

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## INTRODUCTION

This part of the document describes the digital computer program developed to evaluate the aerodynamic and performance characteristics and dynamic behavior of a rotor in autorotative flight operating in proximity of a re-entry capsule. The theory underlying the program formulation is presented in Reference 1.

The program has been subdivided into several distinct parts. The first phase allows calculation of rotor blade linear dynamic response in the flapping, feathering and lagging modes. The second part of the program permits determination of rotor blade airloads including nonlinear effects. The equations of motion describing the articulated rotor blades retained all nonlinear inertial terms and incorporated nonlinear aerodynamics to account for stall, compressibility and reversed flow effects. Provisions were also included to consider the effects on the rotor of the detached bow shock wave generated by the capsule. The final portion of the program features the dynamic stability of the re-entry vehicle. The nonlinear time history of the capsule rotor configuration features rotor force and moment contributions which are a function of the independent variable time.

## DESCRIPTION

The digital computer program described in this section has been developed to study the dynamic behavior and evaluate the aerodynamics and performance characteristics of a rotor in autorotative flight while operating in proximity of a re-entry capsule.

The program is coded in FORTRAN IV (IBSYS Version 12) for the IBM 7040/7094 direct-coupled computing system at Ames Research Center. The program can also be executed on an IBM Model 360/40 digital computer system. Because the program exceeds the capacity of a single core load, the Loader Overlay capability is used. This feature permits the complete program to be subdivided into several smaller sections. These sections or links are executed in a manner which can be user controlled.

The complete program consists of seven sections. The main or calling program; the input data program; the program which calculates blade inertia properties, the coefficients of the linear differential equations of blade motion and the blade response matrices; the program which determines the linear time histories of blade flapping, feathering and lagging motion; the program which generates the nonlinear blade airloads; the program which achieves rotor blade autorotative equilibrium; and finally the program which evaluates the re-entry vehicle dynamic response.

The program initialization and execution is controlled by the subroutine REV01, a control program located in LINK 0 under the overlay structure. The control parameters that determine which program sections are necessary to process the particular condition are user supplied and are read by subroutine REV01. The program is presently limited to single case processing, but can be easily modified to include multiple case operation.

Detailed flow charts for the seven main programs (REV01 through REV07) are presented in Figures 3 through 9, respectively. Program listings of the source decks are included in Appendix A, input listings are in Appendix B, and a typical output listing is in Appendix C.

## DATA INPUT SECTION

This part of the program designated REV02 supplies the data necessary for program operation. Included in this section is the NASA library subroutine AT62 which is coded in FORTRAN IV to approximate the U. S. Standard Atmosphere, 1962. The subroutine computes density, pressure, temperature and velocity of sound at any geometric altitude in the range -16,500 ft to 2,320,000 ft. If a wind tunnel condition is to be processed, the NASA library subroutine AT62 can be removed and the actual wind tunnel density, temperature and velocity of sound substituted in a modified AT62 subroutine. The input program also features the user controlled option of supplying an inflow distribution as a function of radius and azimuth station. One further user option regards the incorporation of nonlinear aerodynamic section data. This option allows the two-dimensional aerodynamic data to be read from cards or to be generated analytically in a subsequent subroutine AERDAT appearing in REV05. The remaining geometric, inertial and linear aerodynamic data necessary for processing a particular flight condition is described in the data input listing.

## RESPONSE MATRIX SECTION

This phase of the program generates the inertial and aerodynamic components which form the coefficients of the linear differential equations describing the blade flapping, feathering and lagging motion under both steady and maneuvering flight conditions. The data required to establish the blade inertial and aerodynamic parameters are read from tape written in section REV02. The basic method is generally applicable to sets of differential equations which have coefficients which are arbitrary functions of time, in this instance, the independent variable. Except for the assumptions of linear aerodynamic force and moment coefficients and small induced angles, actual Mach number effects and reversed flow effects are treated exactly.

The application of an integrating matrix operator to the differential equations of flapping, feathering and lagging motion written in matrix form yields the response matrices of the system which depend only on the coefficients of the variables. The response matrices of the system are completely independent of the applied forcing function. These matrices are stored on tape and are employed in REV05 for calculation of the complete nonlinear response of the system.

## LINEAR TIME HISTORIES

This portion of the program establishes the matrices which multiply the system initial conditions. The response matrices coupled with these initial condition matrices may be considered a numerical simulation of the system described by the equations of motion. System response to any forcing and initial condition may be obtained by simple matrix multiplication. These initial condition matrices are rectangular, having six columns, one for each initial value of flapping, feathering and lagging displacements and velocities. The matrix is composed of a maximum of twenty-five rows, one for each station considered from 0 to 360 degrees inclusive. The initial condition matrices represent the time history of the response of the system to initial displacements or velocities in the flapping, lagging, or feathering degrees of freedom when the forcing function is zero.

This phase of the program features an option for calculating only the linear time histories; subsequent nonlinear airloads without the linear time histories; or both time history and nonlinear airloads. Also, incorporated in this portion of the program is the determination of the maximum absolute displacement and velocity for the three degrees of freedom, for each cycle of time history response. The accompanying azimuth station at which the maximum response occurs is also indicated. All the matrix operations involve diagonal, rectangular or triangular matrices.

## NONLINEAR AIRLOADS

This section of the program determines the nonlinear rotor blade airloads. An iterative procedure is established to achieve rotor blade equilibrium in the three degrees of freedom considered. Equilibrium is established when the values of flapping, feathering and lag angles are within a specified tolerance for two successive iterations. The aforementioned tolerance is user supplied on input.

The data necessary for processing this phase of the program is supplied on tape from REV02 and REV04. The fixed geometrical and inertial data are transmitted from parts REV02 and REV04. The matrices necessary to evaluate the initial condition matrix in the periodic solution are also obtained from REV04.

This phase of the program features all nonlinear aerodynamic effects including stall, reversed flow and compressibility effects. These effects are reflected in the program by employing two-dimensional aerodynamic data which is transmitted from REV02.

One added option is the ability to use analytically derived aerodynamic data as a substitute for the two-dimensional data. Subroutine AERDAT which is user supplied and controlled by NAERO allows calculation of the aerodynamic data. Finally, the program generates a tape input to REV06 including elemental airloads for integration into total rotor forces and moments.

## TORQUE EQUILIBRIUM

This portion of the program establishes the procedure to achieve rotor torque equilibrium. Once rotor autorotation has been effected the program then determines the rotor disk shock wave intersection and associated flow conditions. Subroutines INFLOW and INTRSC are employed for these calculations. Data is then stored on tape, including the inflow ratio, advance ratio and density ratio distributions which were generated in the aforementioned subroutines. This information is supplied to REV03 and REV05.

If the zero torque condition has not been achieved, iteration is established between sections REV05 and REV06 with blade collective pitch angle as the independent variable. Torque iteration is initiated with a simplified relationship using linearized rotor theory (Reference 2), expressing rotor torque as a function of blade collective pitch angle. A first order interpolation is employed to estimate the third value of blade pitch angle based on the previous two values of torque and their respective blade pitch values. For all subsequent iterations, a second order function is used relating torque and blade collective pitch. The three most recent values of torque and associated blade angles are retained to evaluate the succeeding trial value for blade pitch angle. Once torque equilibrium has been effected and the rotor disk shock wave intersection determined, the program proceeds in normal fashion to REV03, and following sections to again establish rotor torque equilibrium.

When zero torque is obtained the second time, the blade pitch angle remains constant for future entry into the rotor airloads program. Subroutine OUT2 is then employed to print the rotor blade distributions of angle of attack, out-of-plane airloads, in-plane airloads and moments about the blade feathering axis. Subroutine OUT2 then calls, at user option, subroutines HRANAL, HRA1AR, and INTANG. These routines calculate the harmonic components of blade airloading, the harmonic components of blade flapping and feathering response and integer angle of attack variation as a function of radial and azimuth station respectively.

Subroutine FOROUT prints the total rotor forces and moments. The rotor force and moment data and rotor operating condition are transmitted on tape for processing of REV07.

## VEHICLE STABILITY

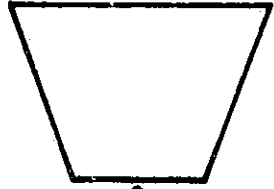
This phase of the program, designated REV07, is comprised of several subroutines. The function of REV07 is, basically, to read the vehicle geometric and inertial data transmitted from REV02 and the rotor force and moment data transmitted from REV06 and call the necessary subroutines for program execution.

The first order differential equations of motion simulating the vehicle dynamic stability are integrated in subroutine ADAMS, which was supplied to the contractor by NASA Ames. The first derivatives of the equations of vehicle motion are computed in subroutine DERIV. These derivatives, which are the right-hand sides of the vehicle equations of motion, include all rotor forces and moments resolved into the body axes system as well as the body forces and moments. Subroutine CHECK investigates convergence of the integration process as reflected in the rotor shaft angle of attack, advance ratio, inflow ratio and rotational speed. If these parameters are not within a prescribed input supplied tolerance for two successive time increments, the program returns to the airloads phase via REV03. The return to REV03 is accomplished with new distributions of inflow ratio and advance ratio calculated in REV07. Further data transmitted are pitch and roll rates resolved about the rotor axes system, rotor angular speed, and rotor shaft angle of attack. This iteration procedure is followed until the actual time upper bound, which is also supplied on input is exceeded.

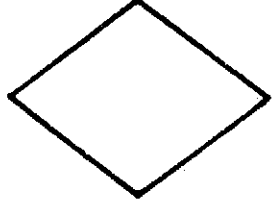
At the initial time, the vehicle is placed in trim by eliminating the moment contribution in the pitch, roll and yaw acceleration equations.



**Process Program Instructions**



**Process Input/Output Data**



**Decision and Branch**



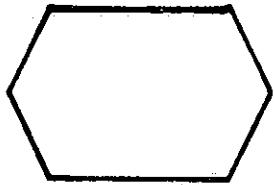
**Program Terminal**



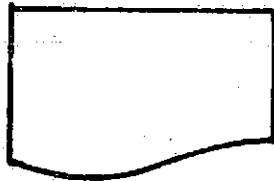
**Connector**



**Magnetic Tape**



**Predefined Programs**



**Printout Documentation**



**Punched Cards**



**Offpage Connectors**

**Figure 1 - Symbols Used In Flow Charts**

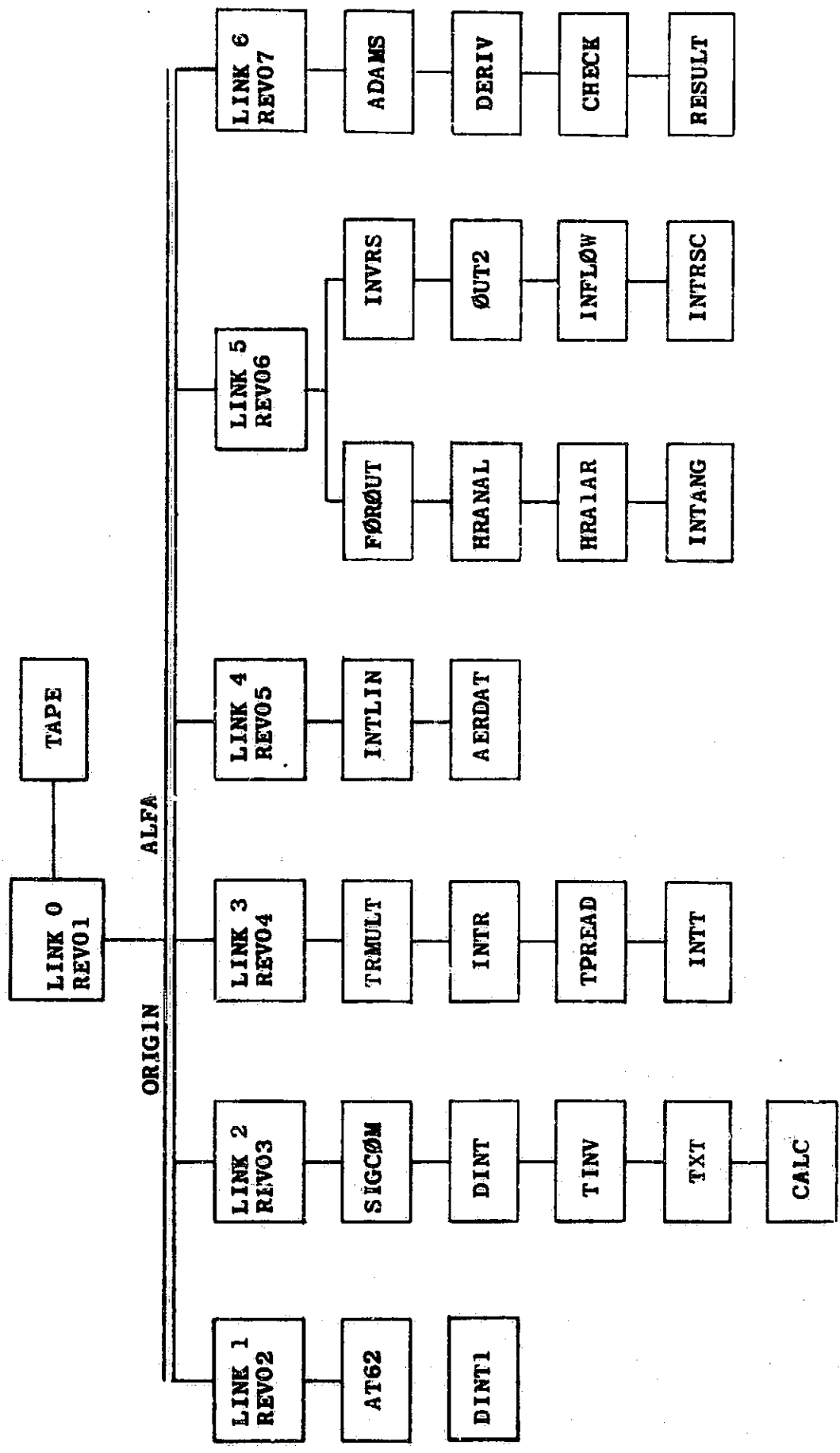


Figure 2. Overlay Diagram For REV Program

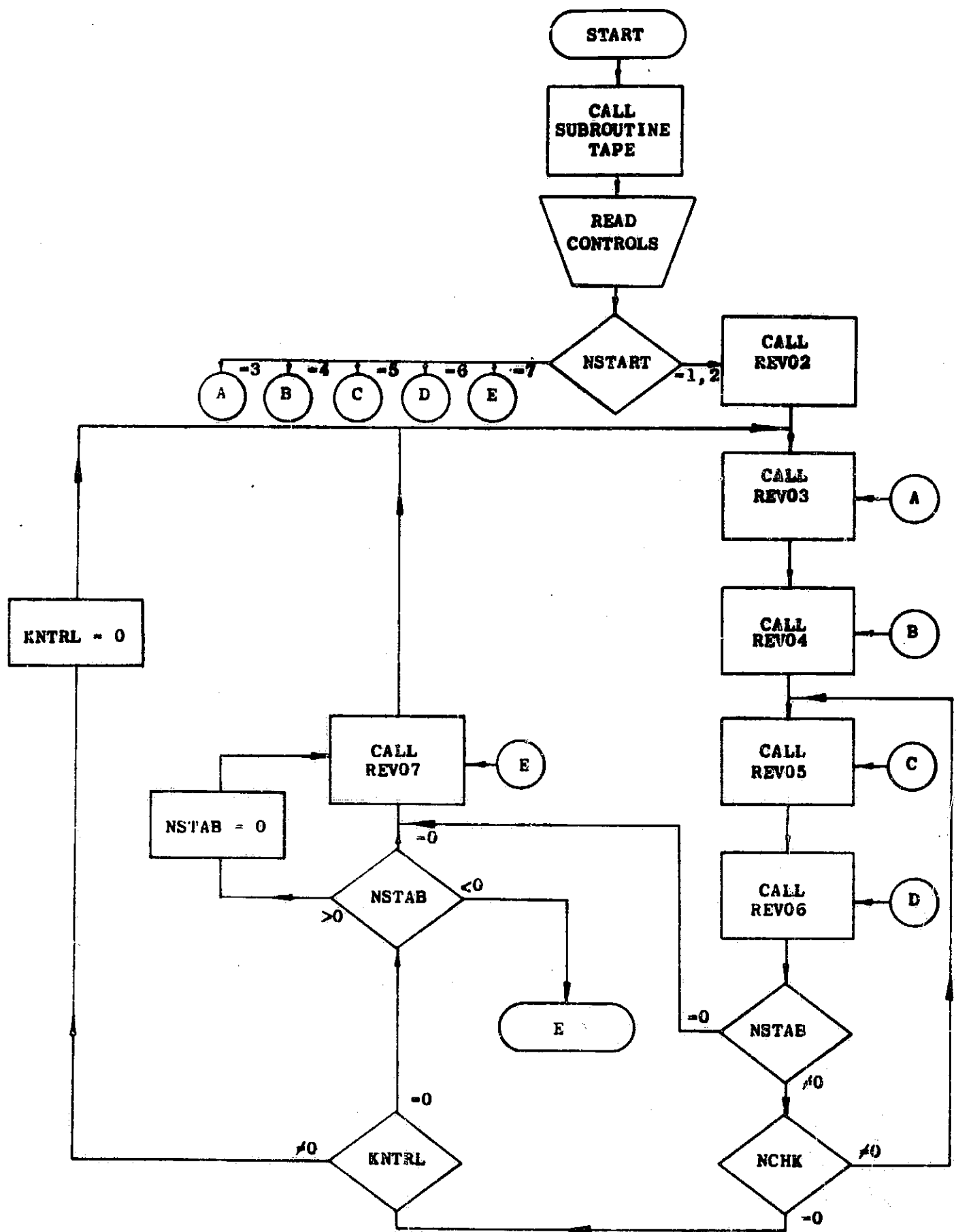


Figure 3. Flow Diagram For REV Main Program

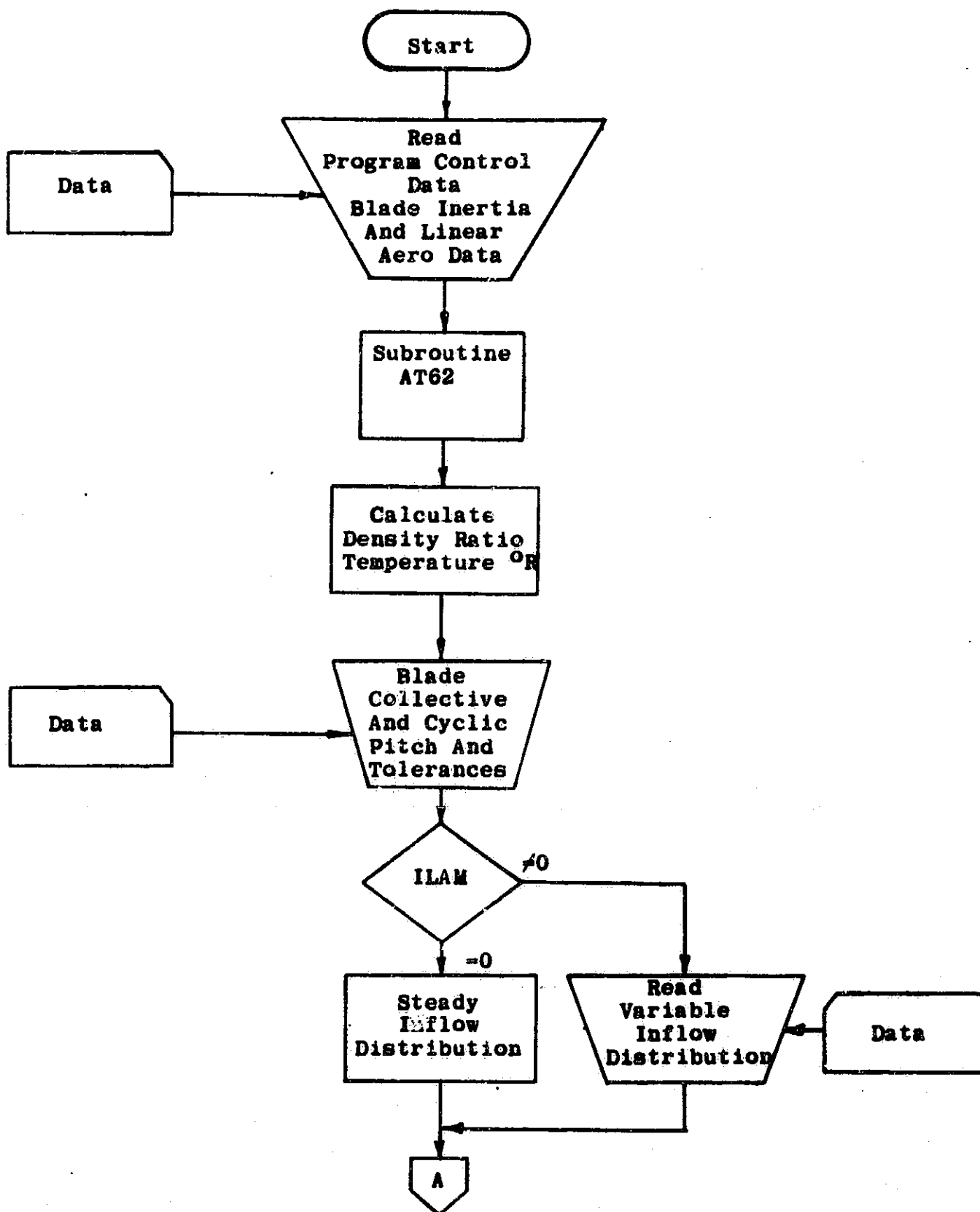


Figure 4. Flow Diagram For REV02 Program

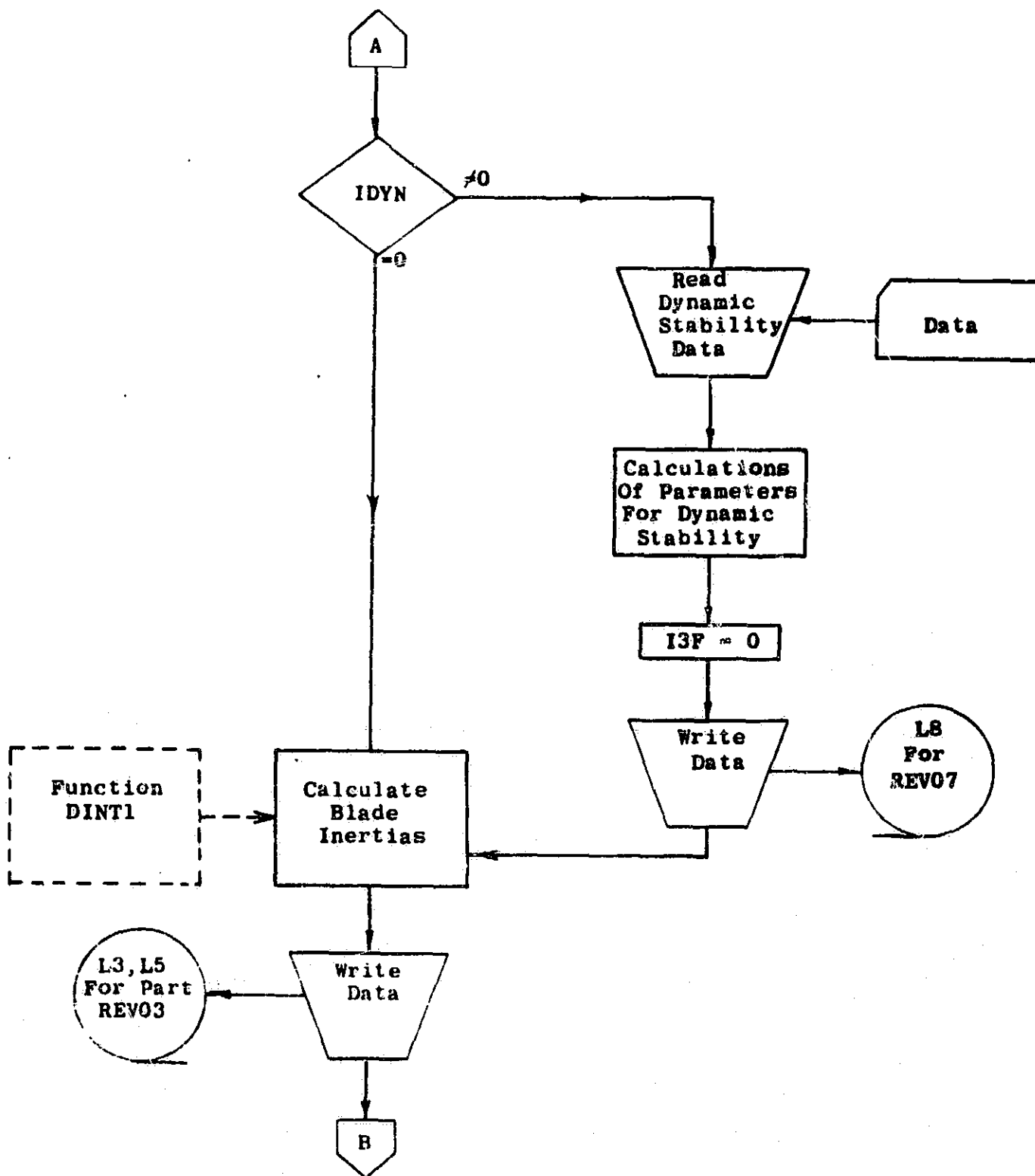


Figure 4 (Continued)

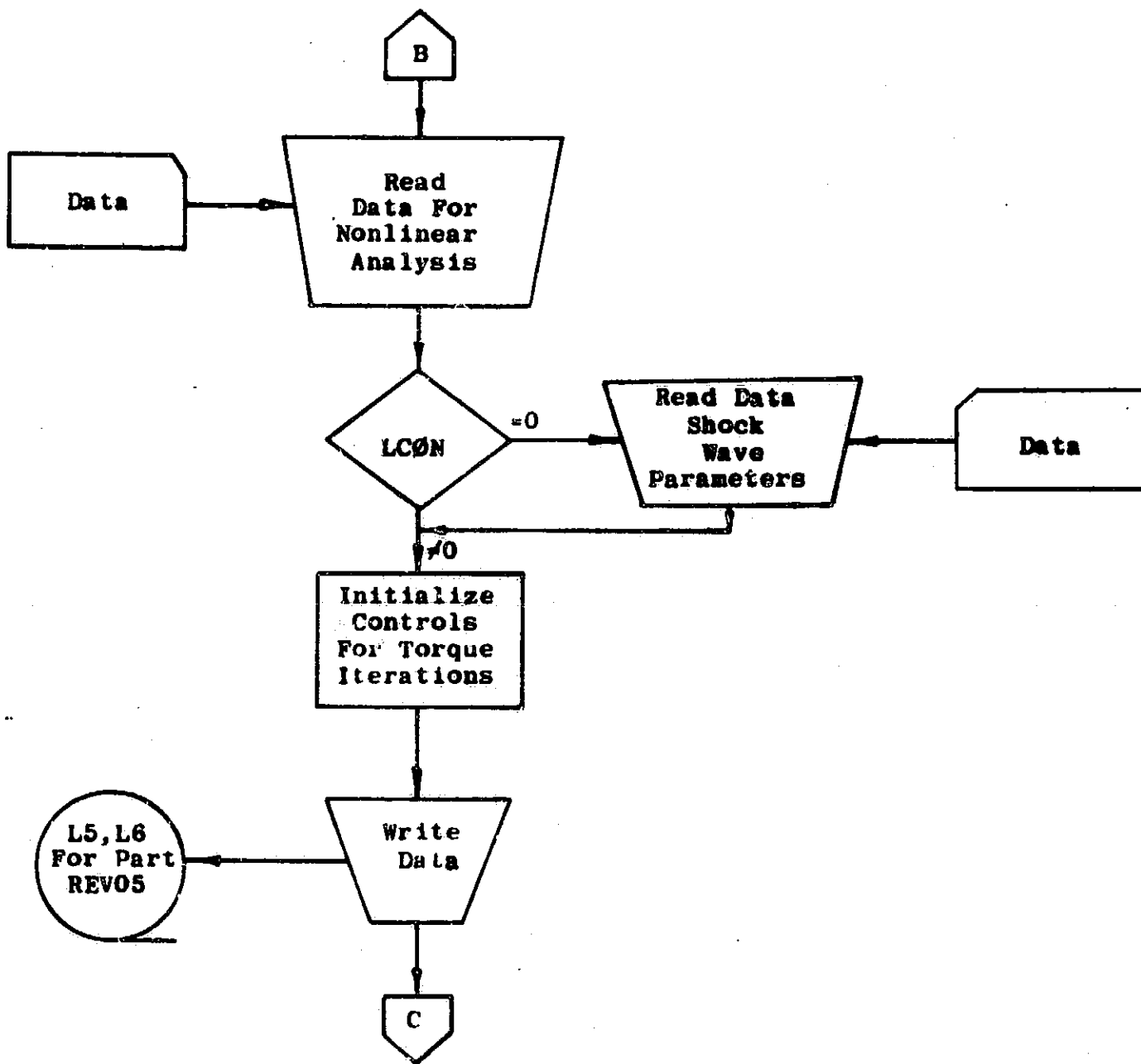


Figure 4 (Continued)

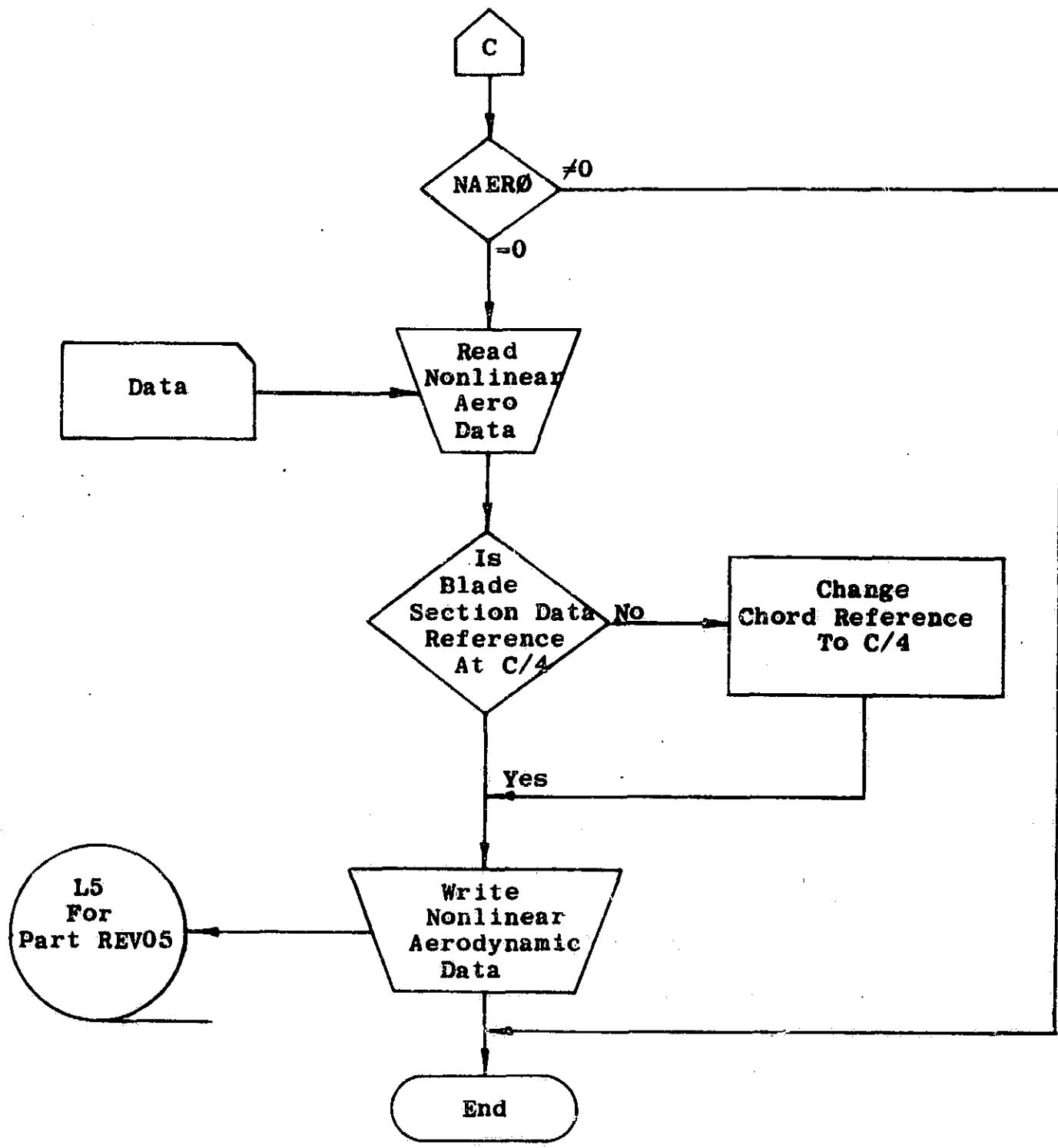


Figure 4 (Concluded)

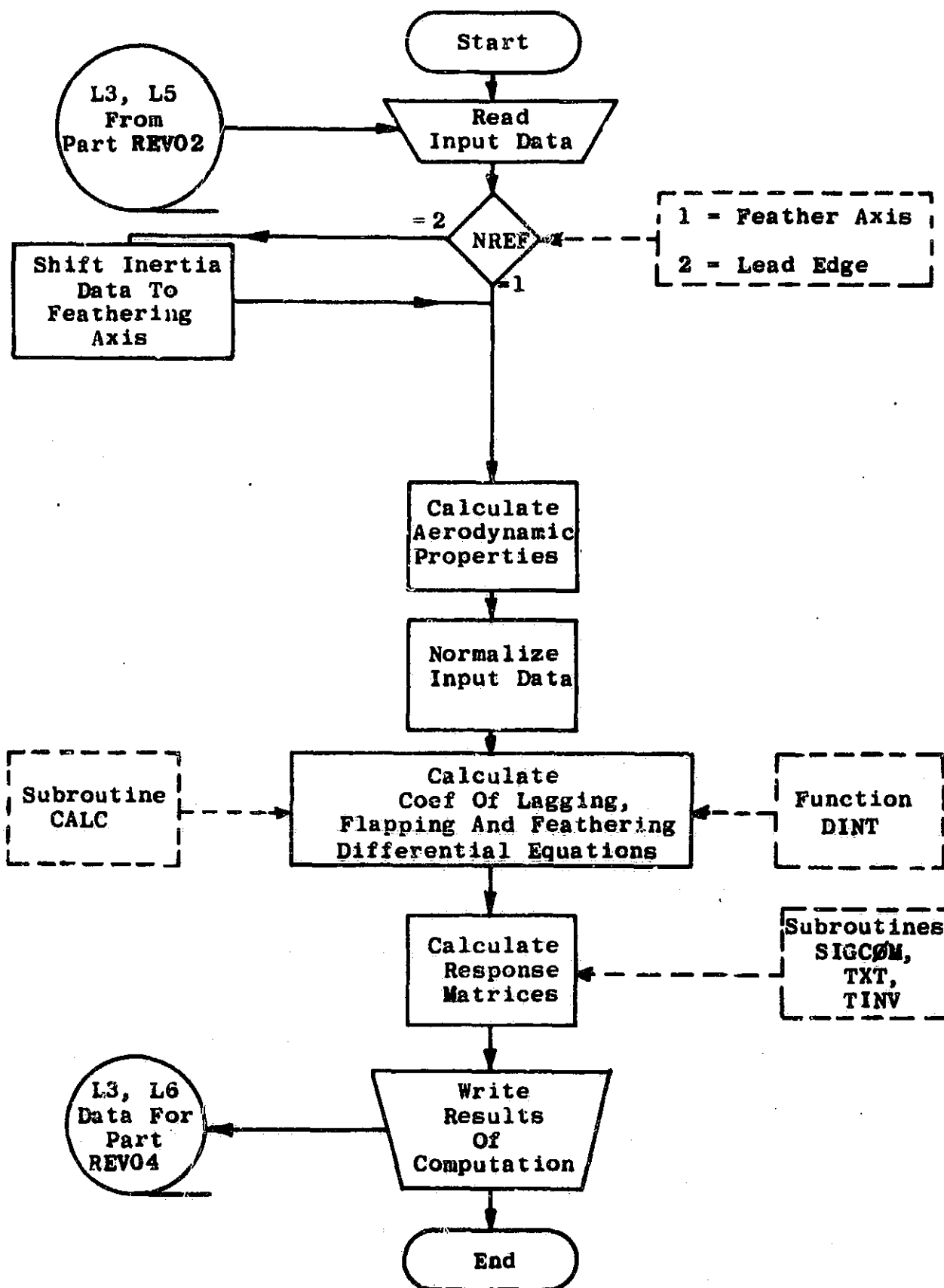


Figure 5. Flow Diagram For REV03 Program

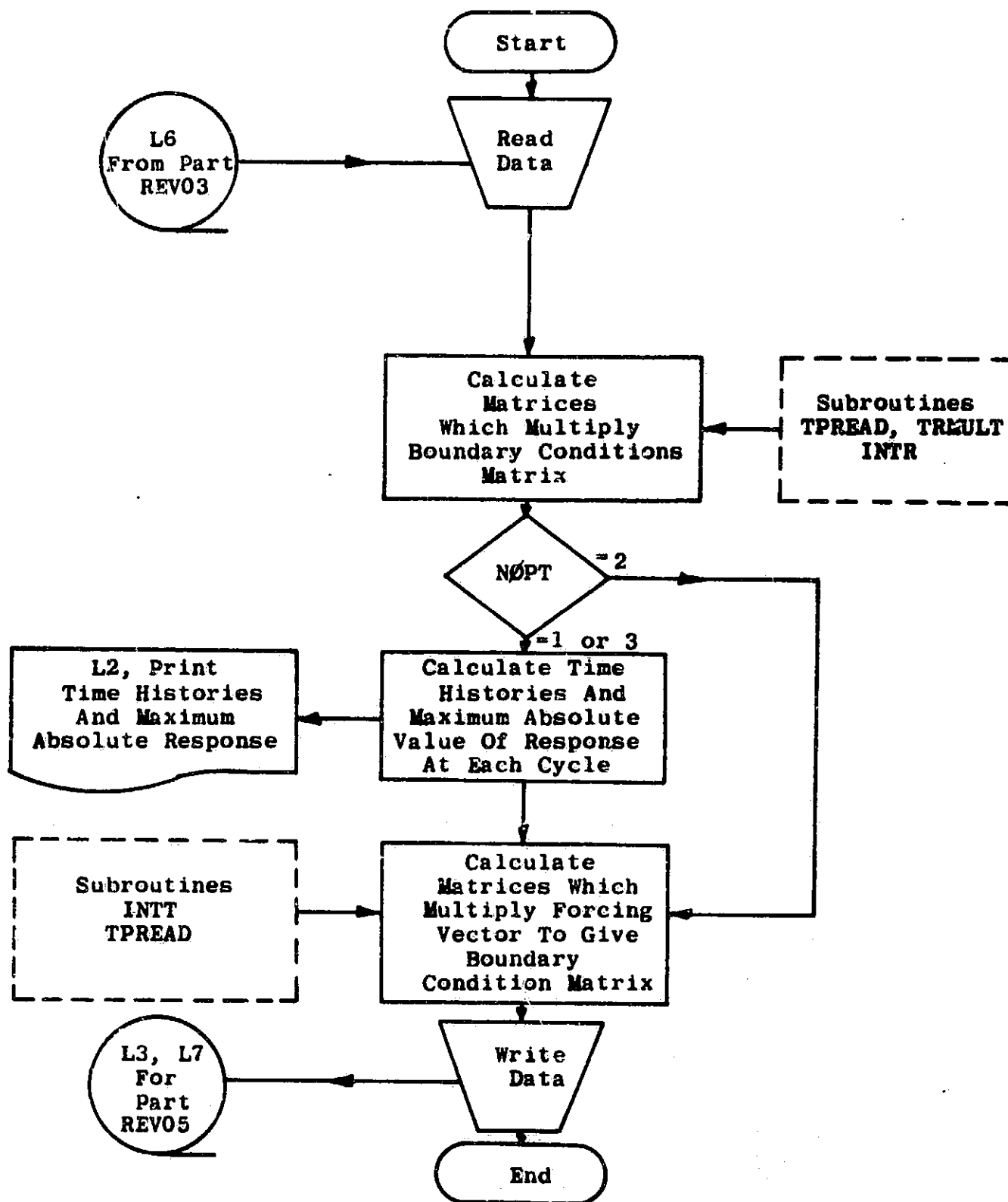


Figure 6. Flow Diagram For REV04 Program

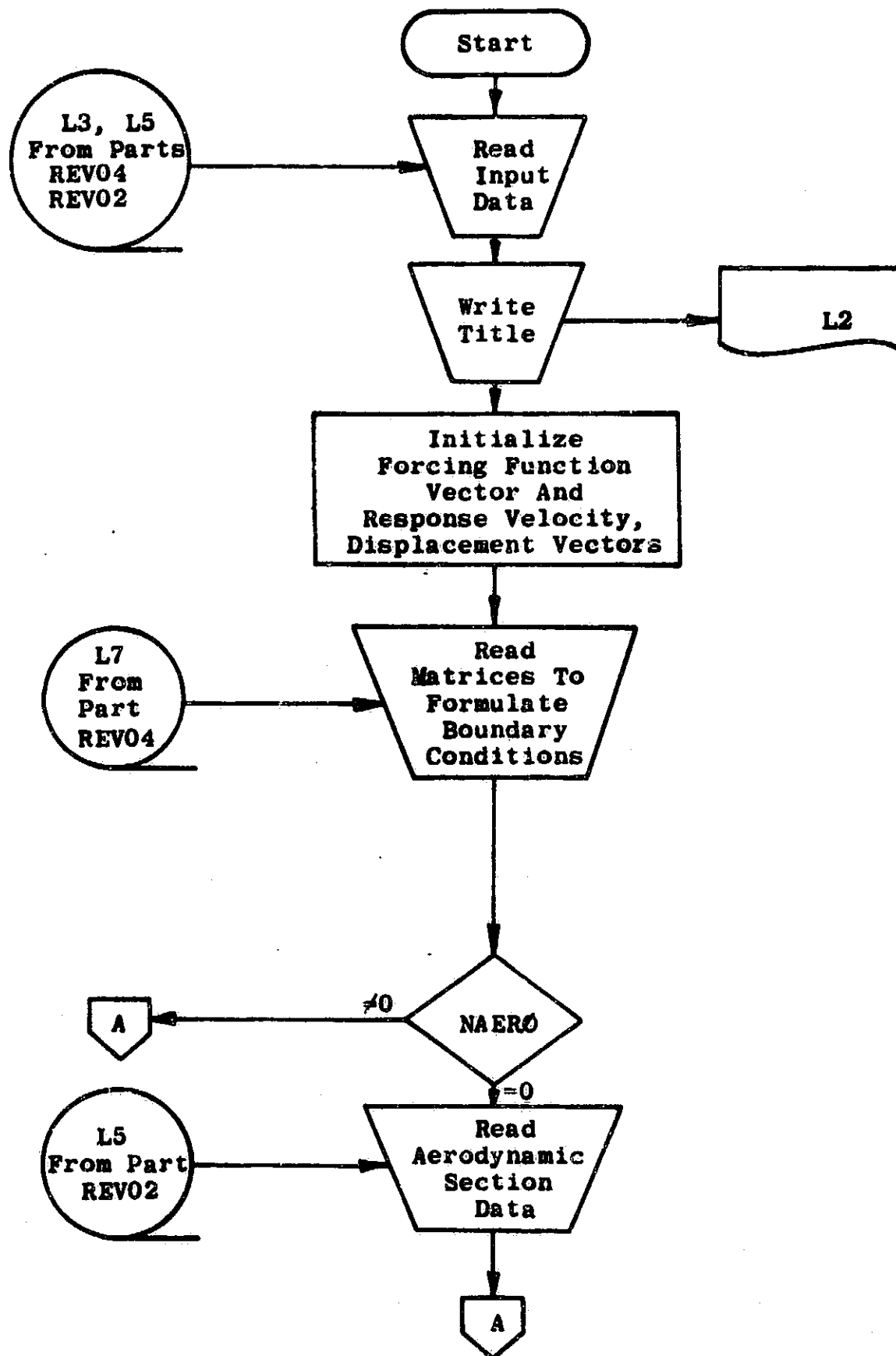


Figure 7. Flow Diagram For REV05 Program

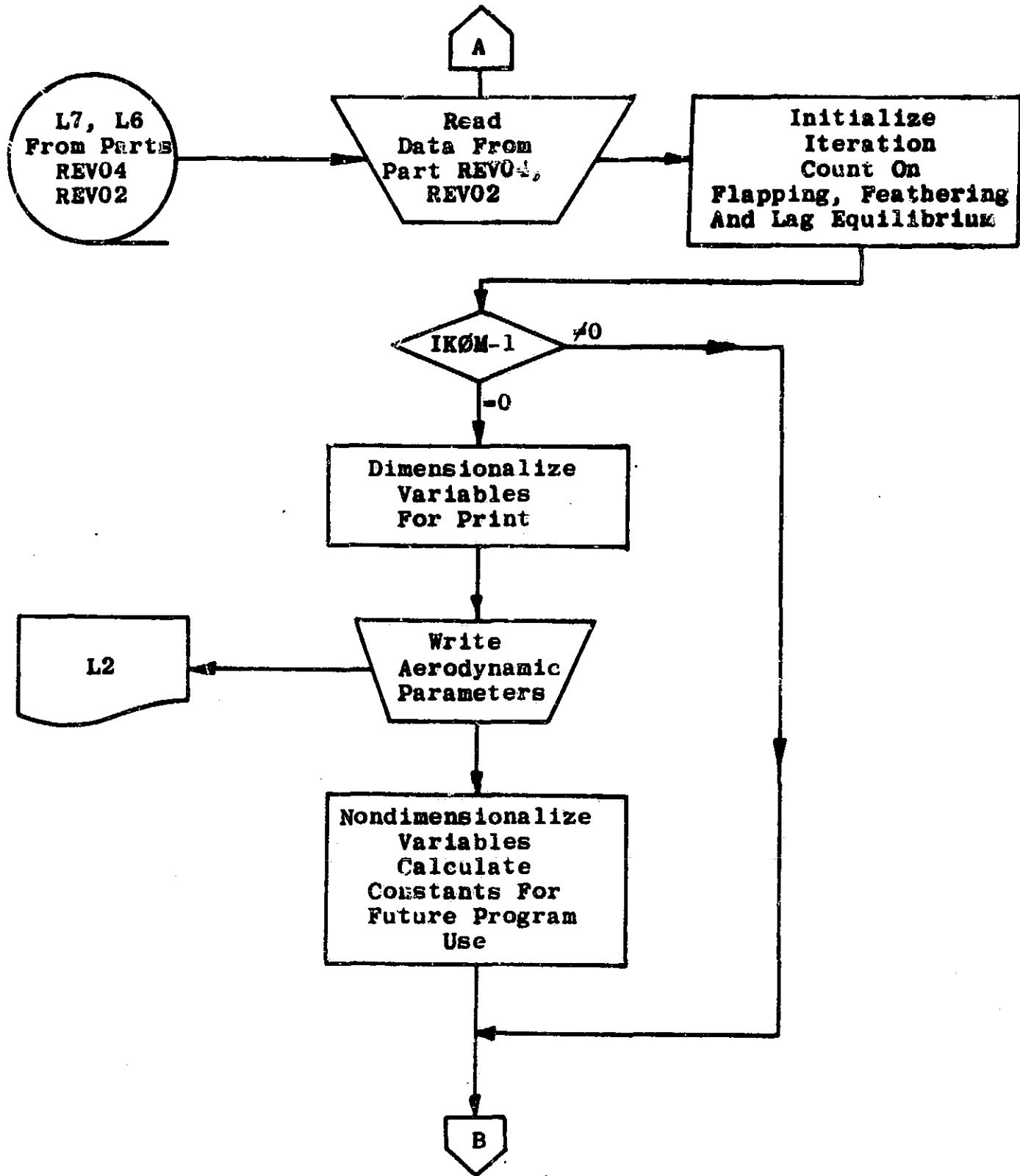


Figure 7 (Continued)

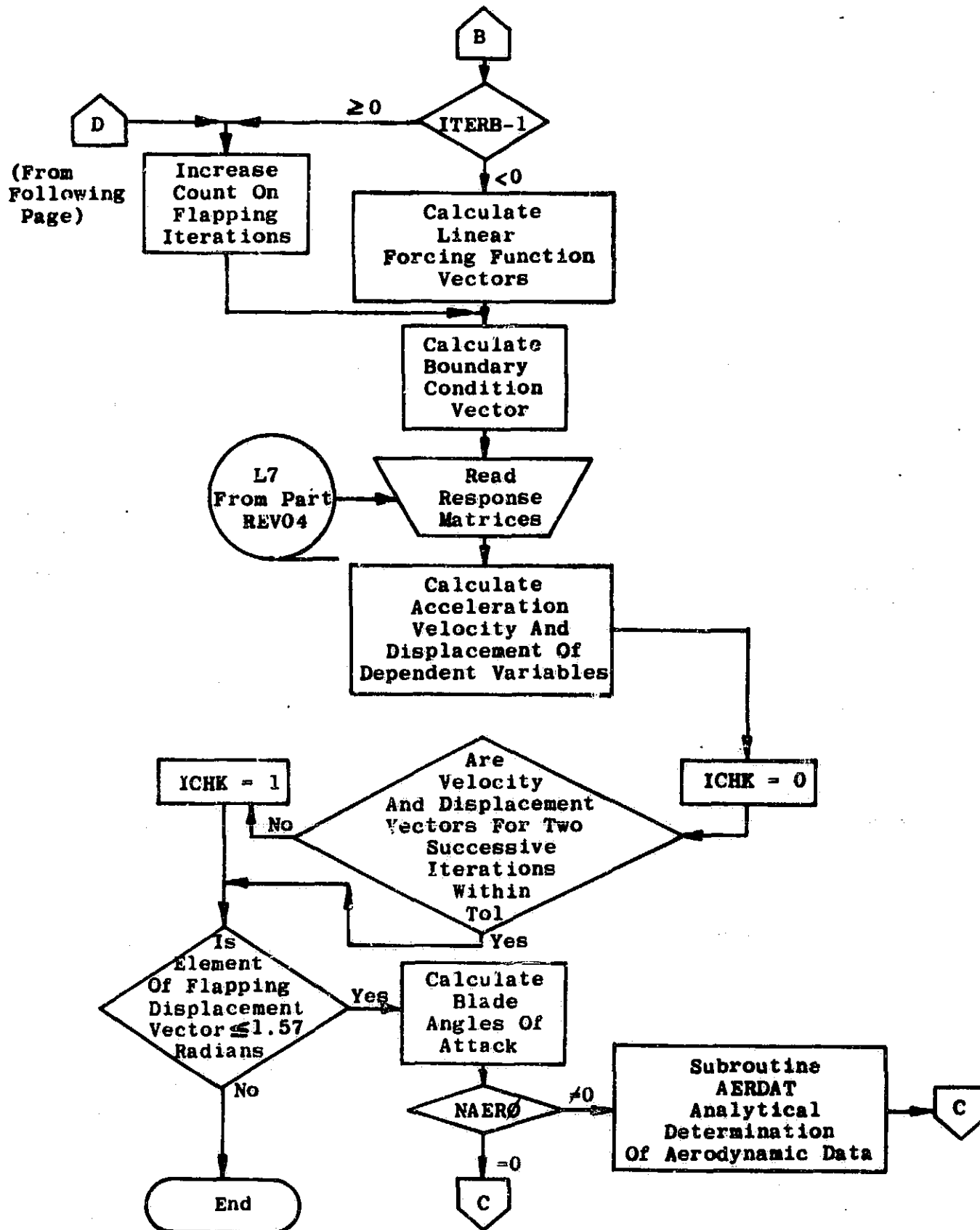


Figure 7 (Continued)

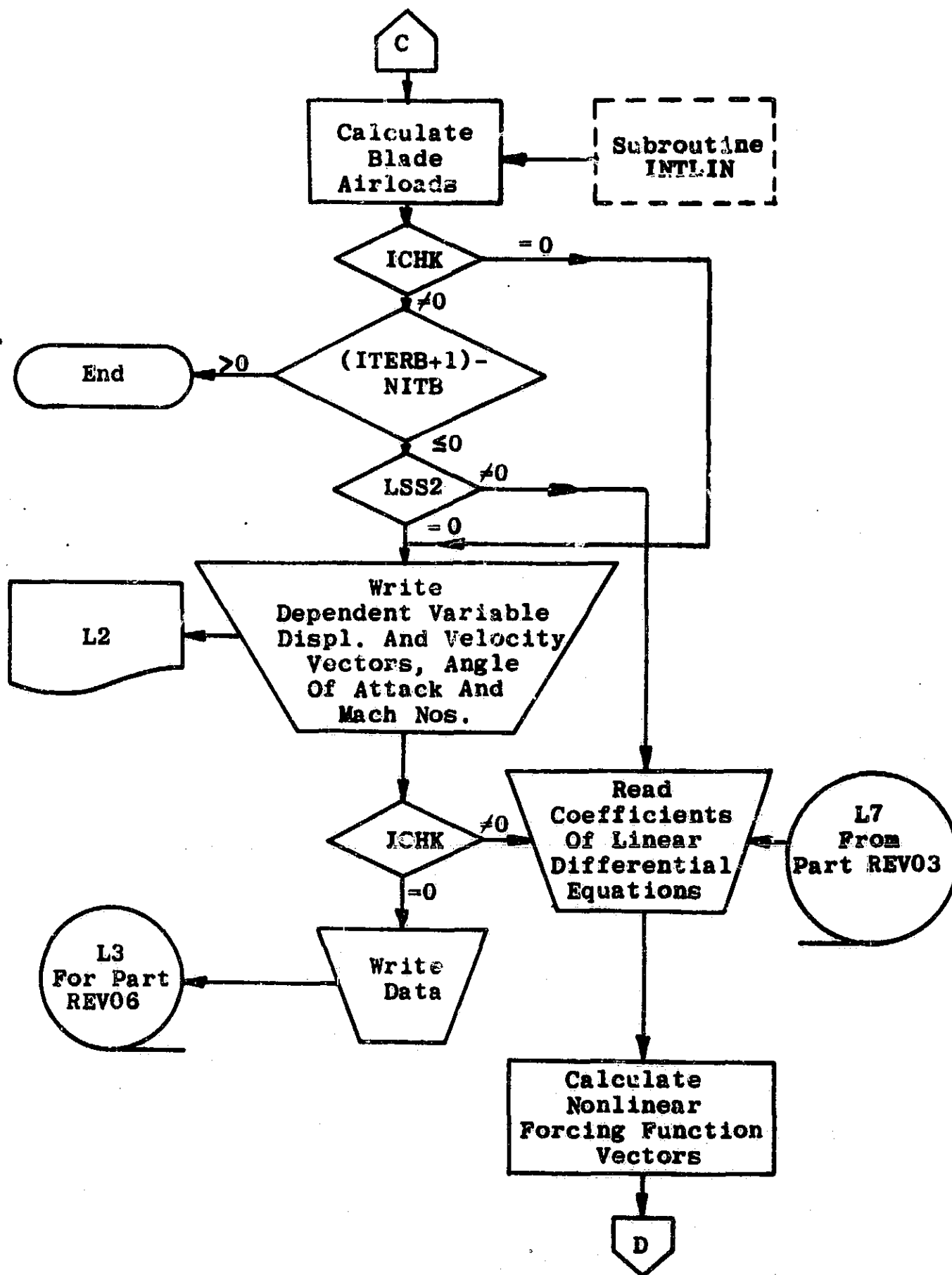


Figure 7 (Concluded)

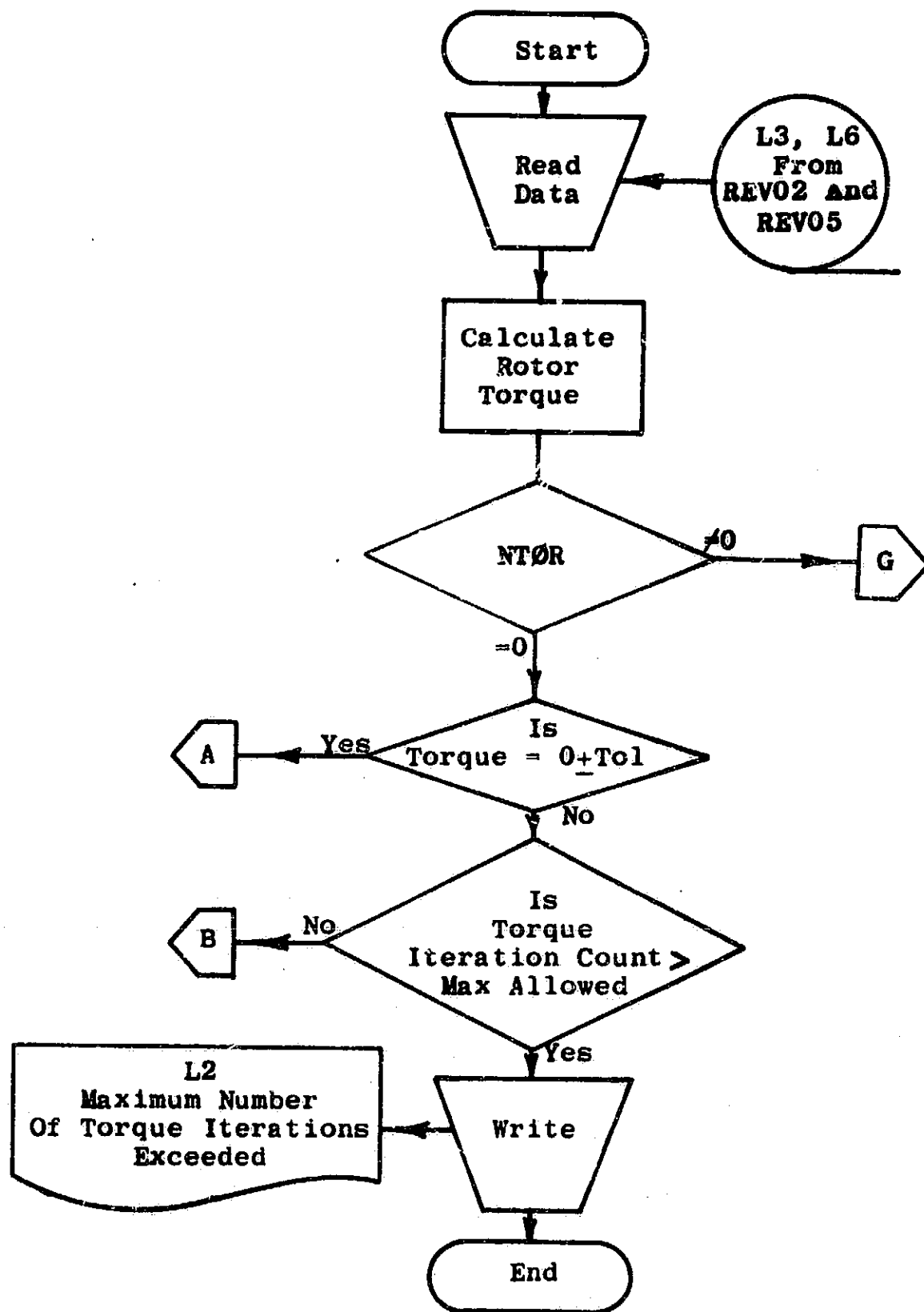


Figure 8. Flow Diagram For REV06 Program

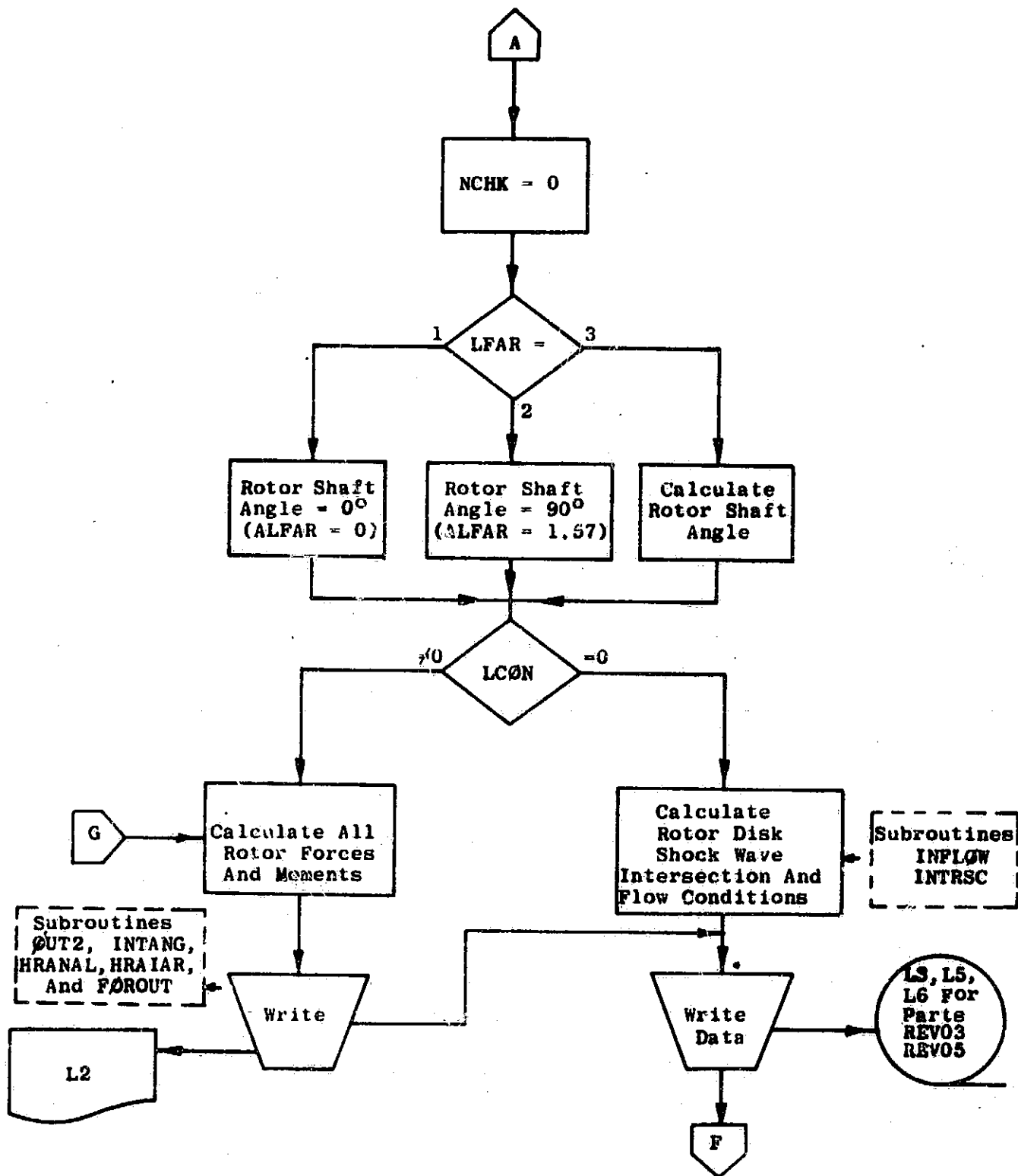


Figure 8 (Continued)

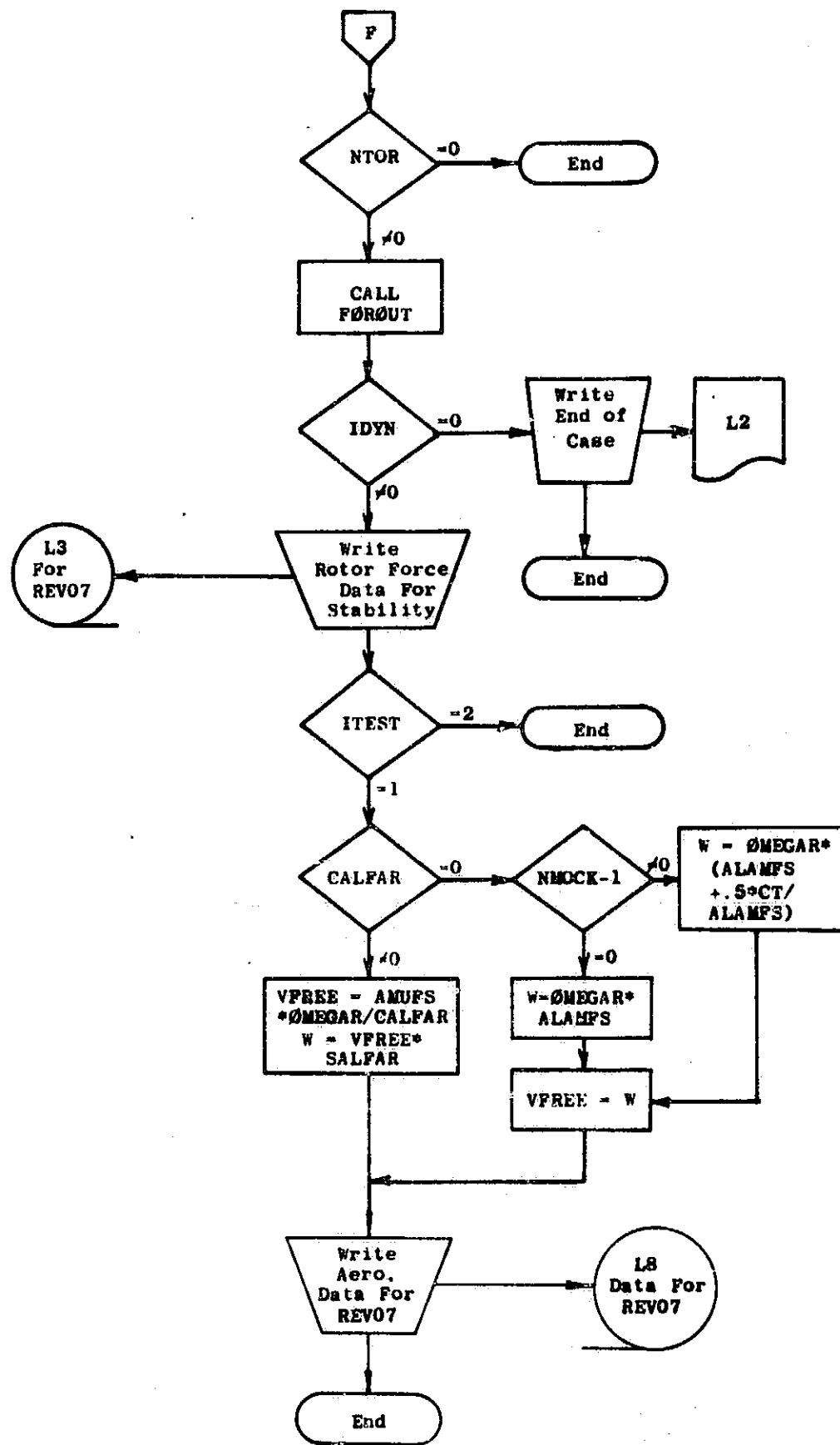


Figure 8 (Continued)

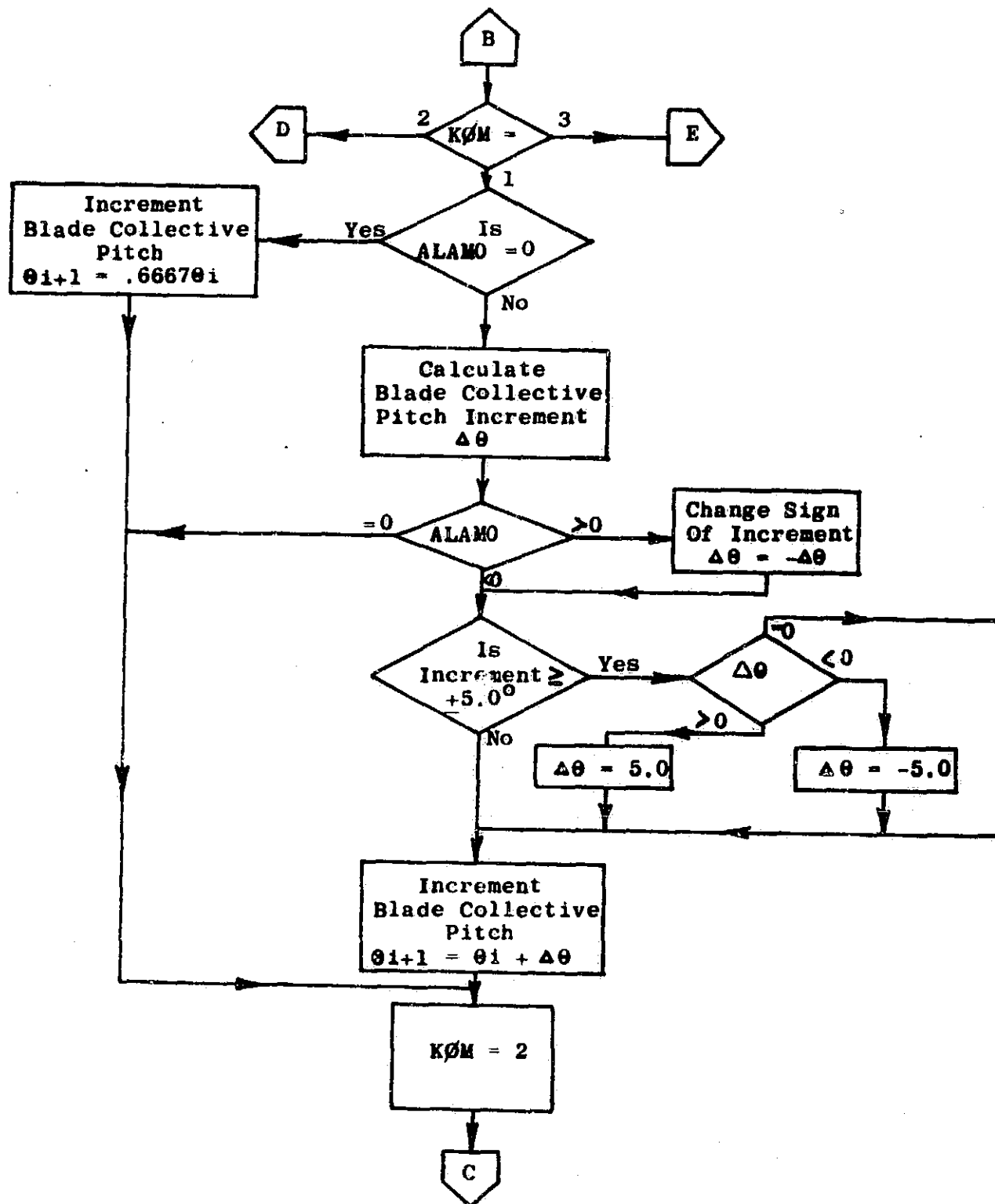


Figure 8 (Continued)

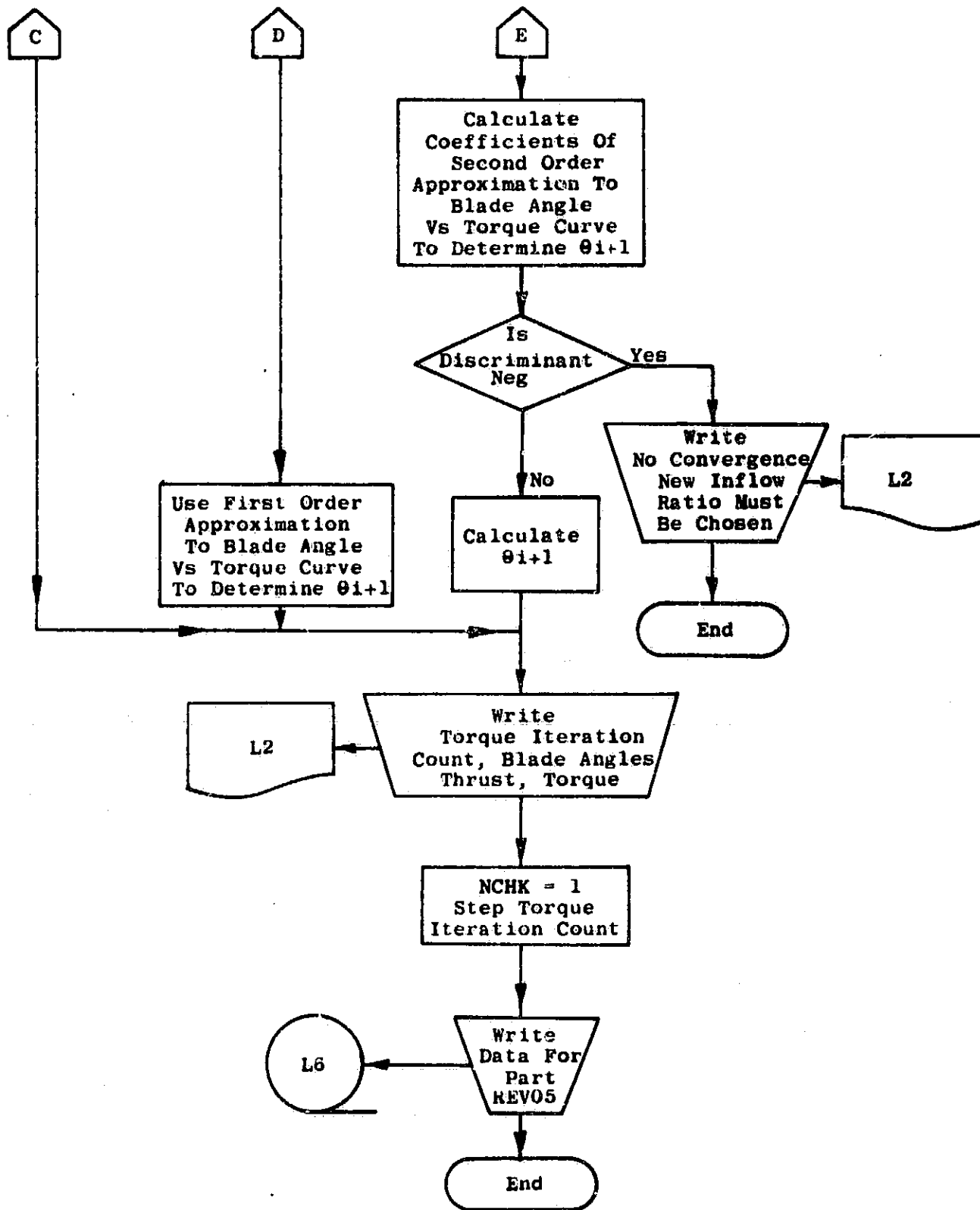


Figure 8 (Concluded)

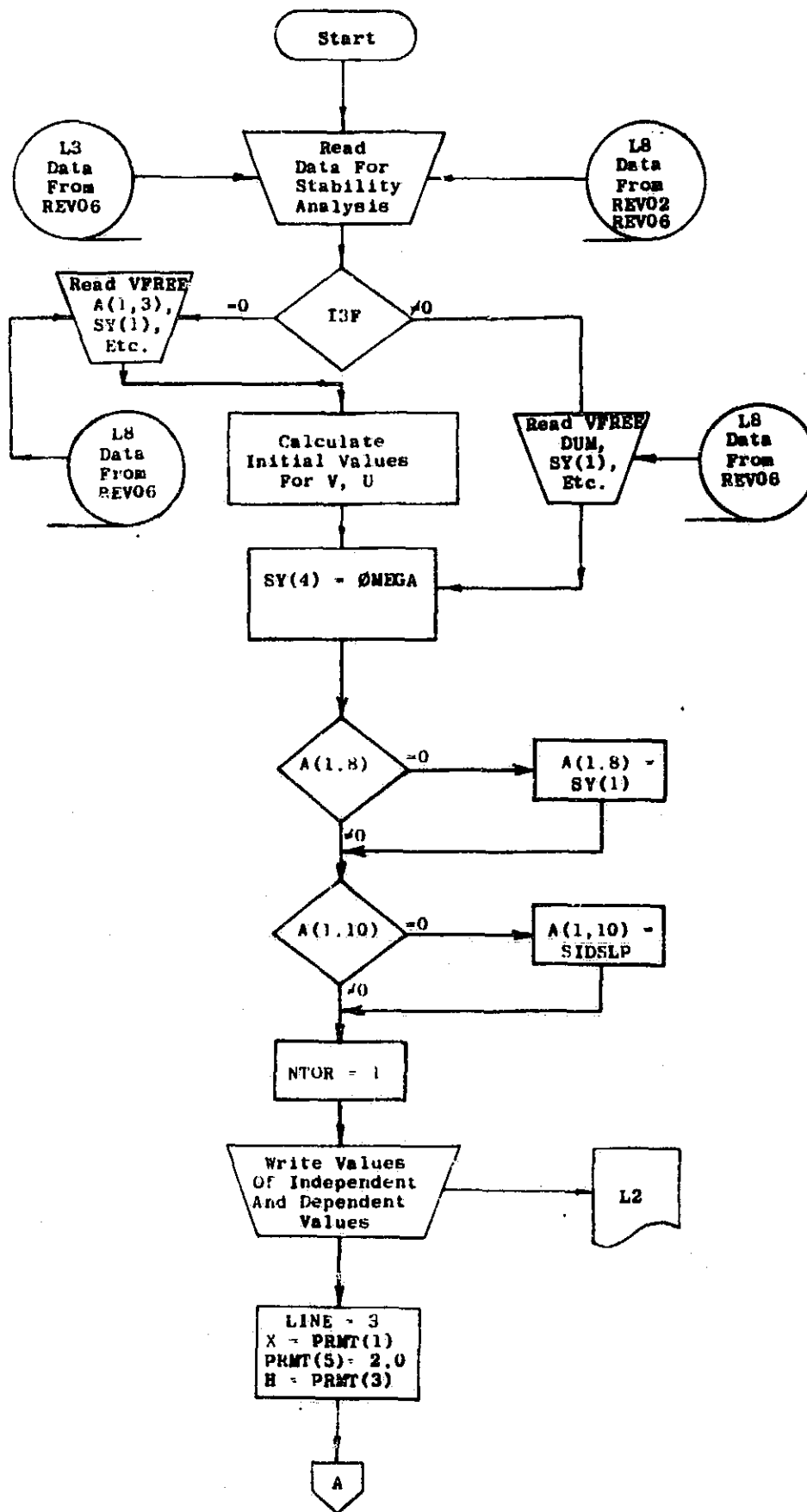


Figure 9. Flow Diagram For REV07 Program And Subroutines

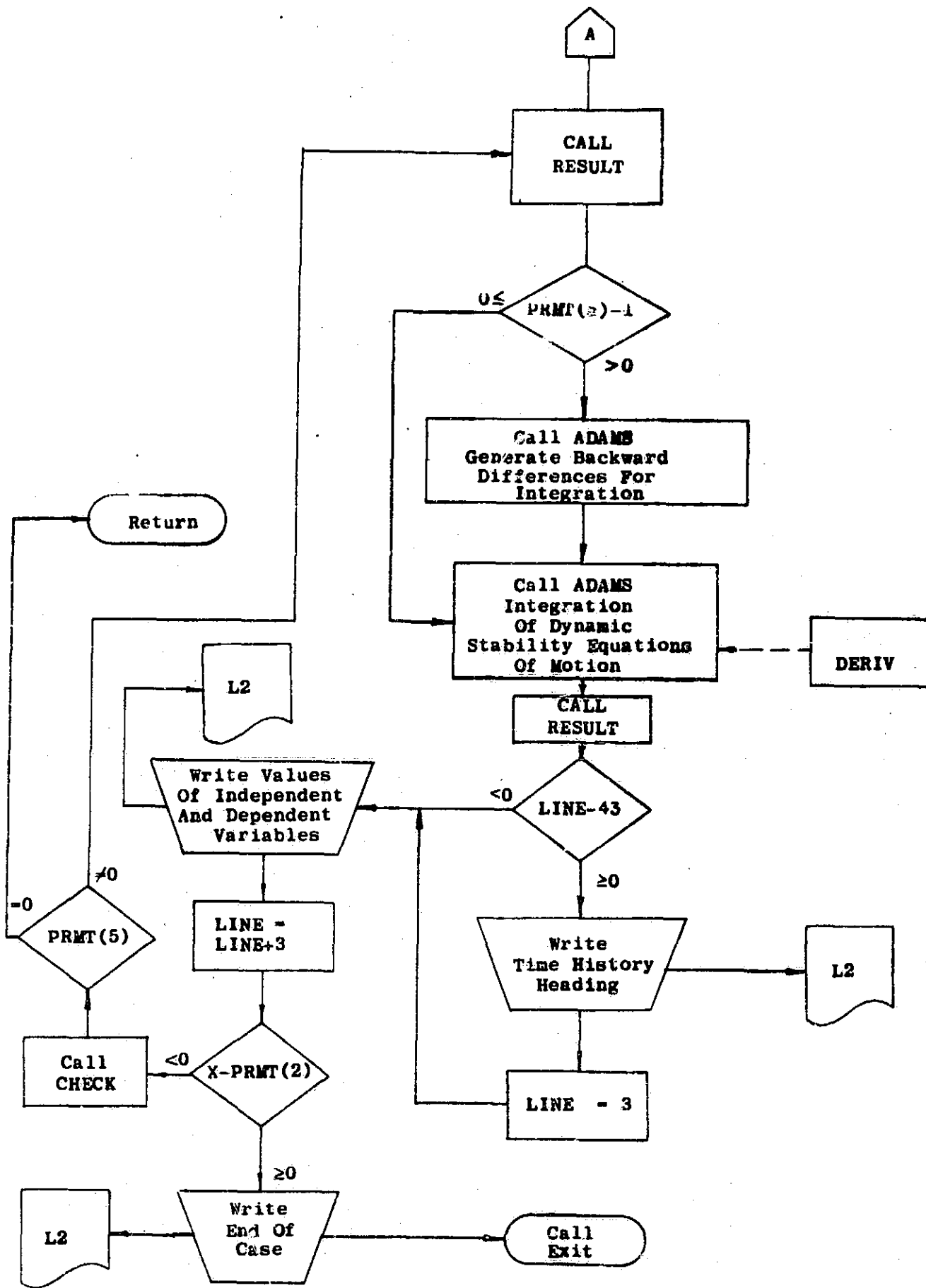


Figure 9 (Continued)

Subroutine CHECK

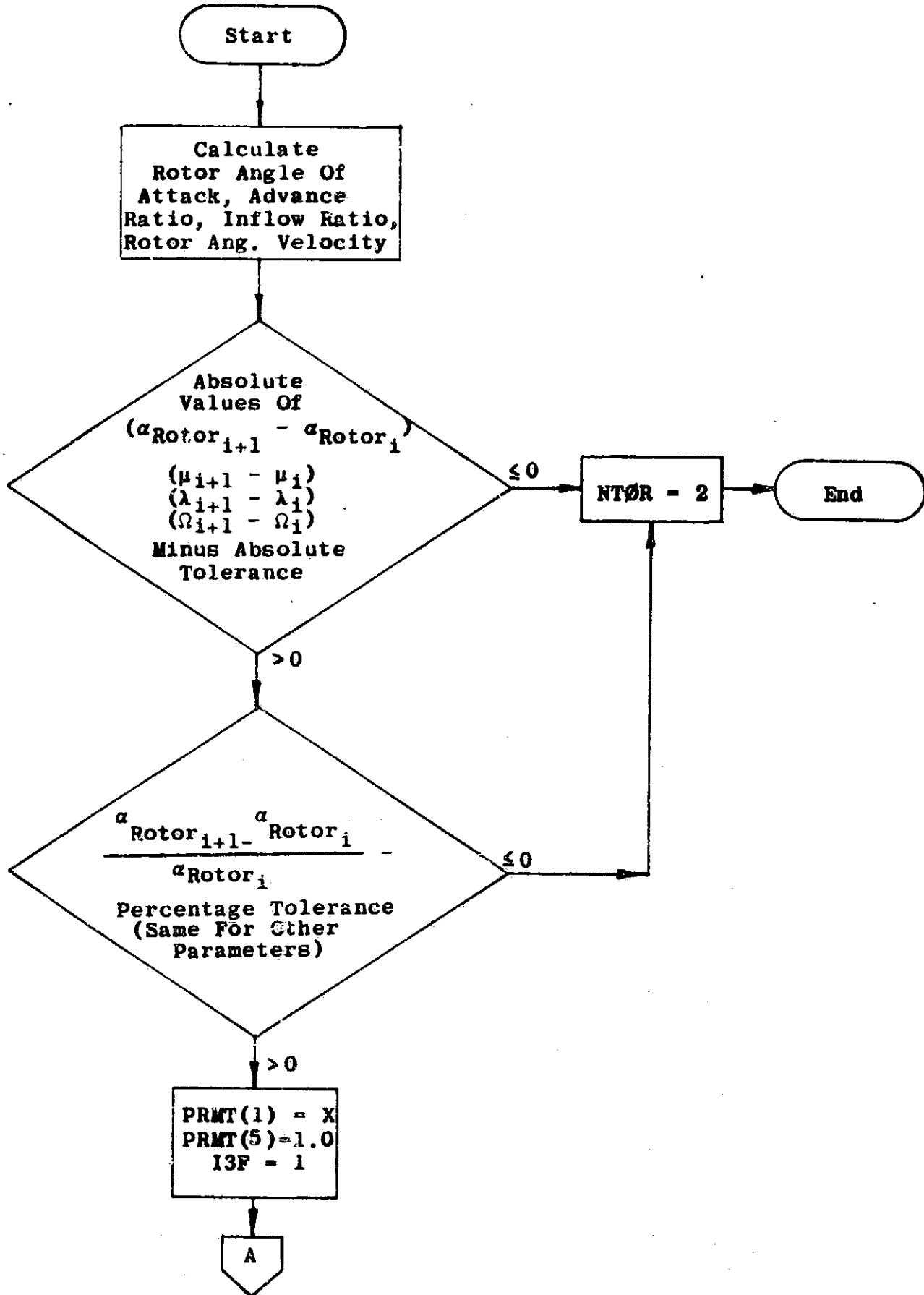


Figure 9 (Continued)

Subroutine CHECK (Concluded)

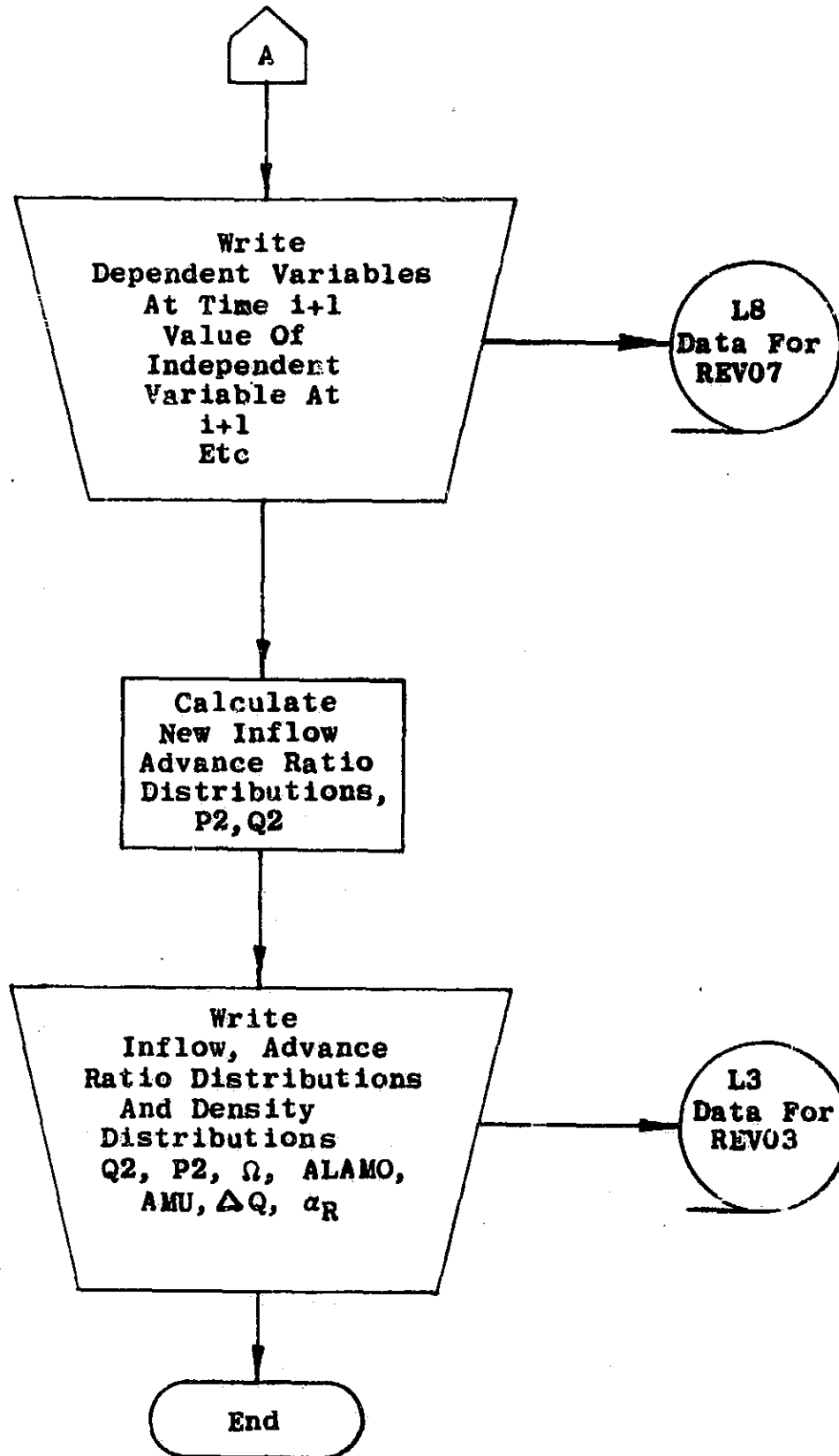


Figure 9 (Continued)

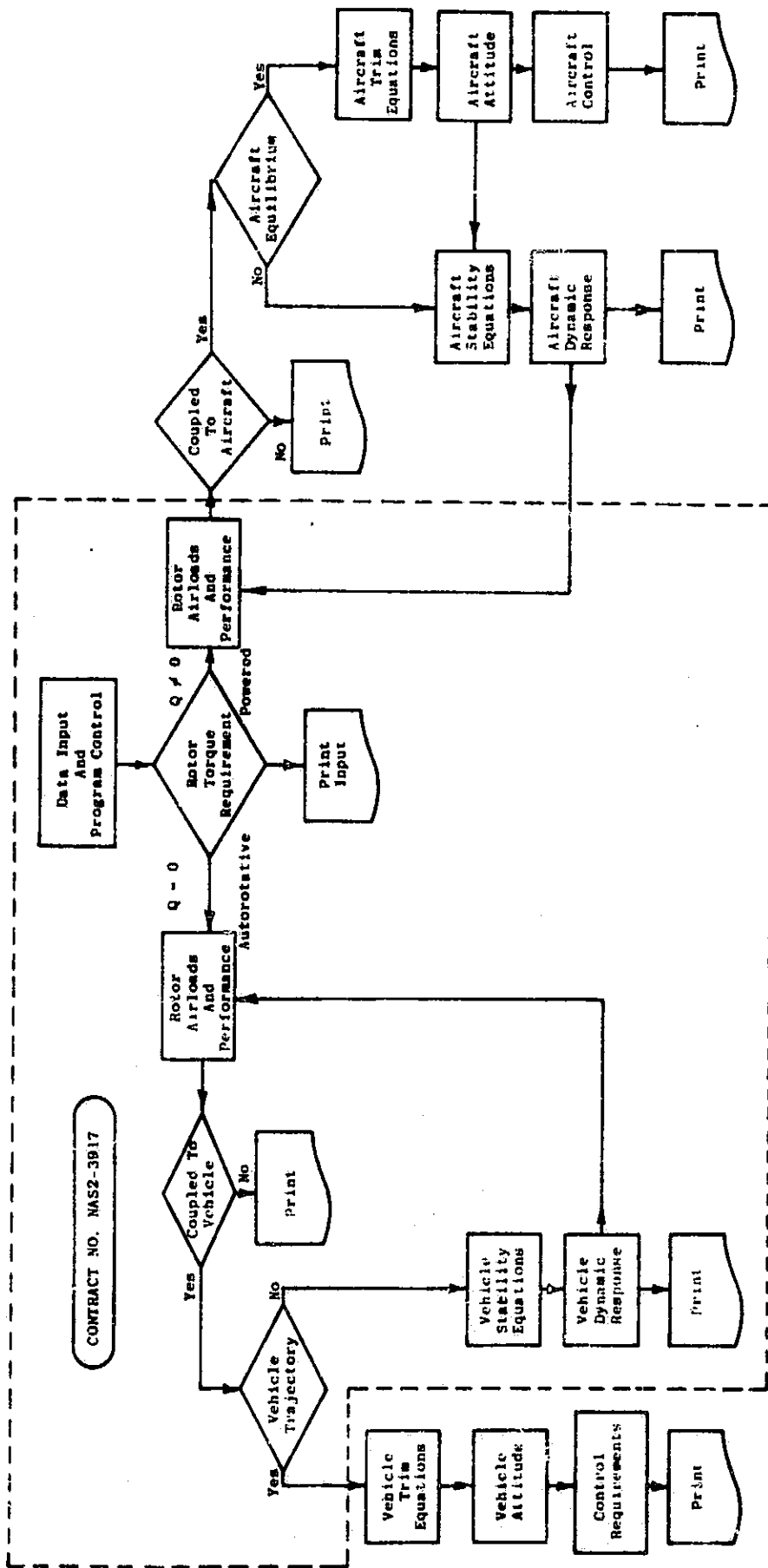


Figure 10. Extensions To Rotor Re-Entry Vehicle (REV) Stability Analysis

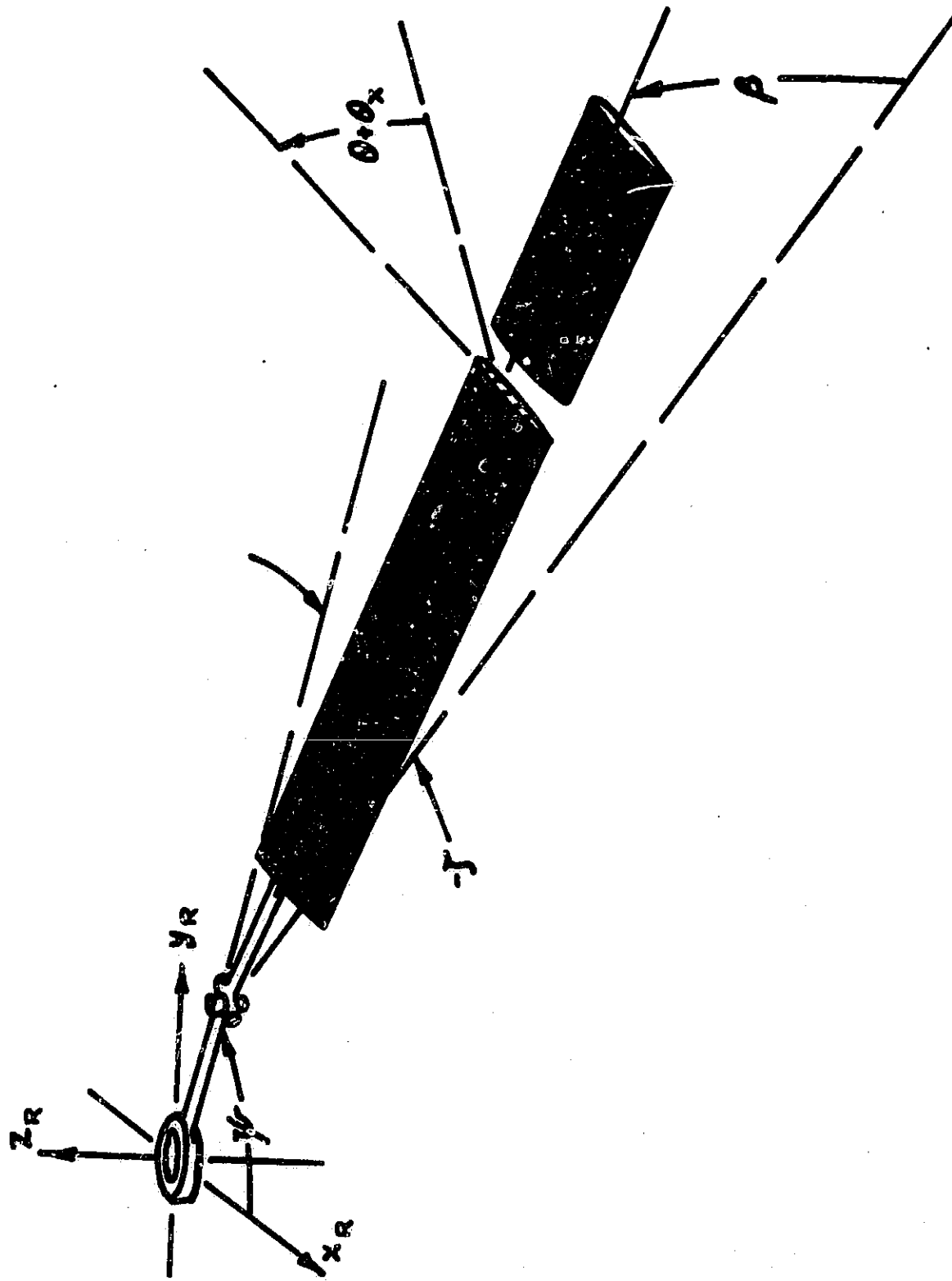


Figure 11. Geometry Of Deflected Blade

ROTOR SHAFT AXIS

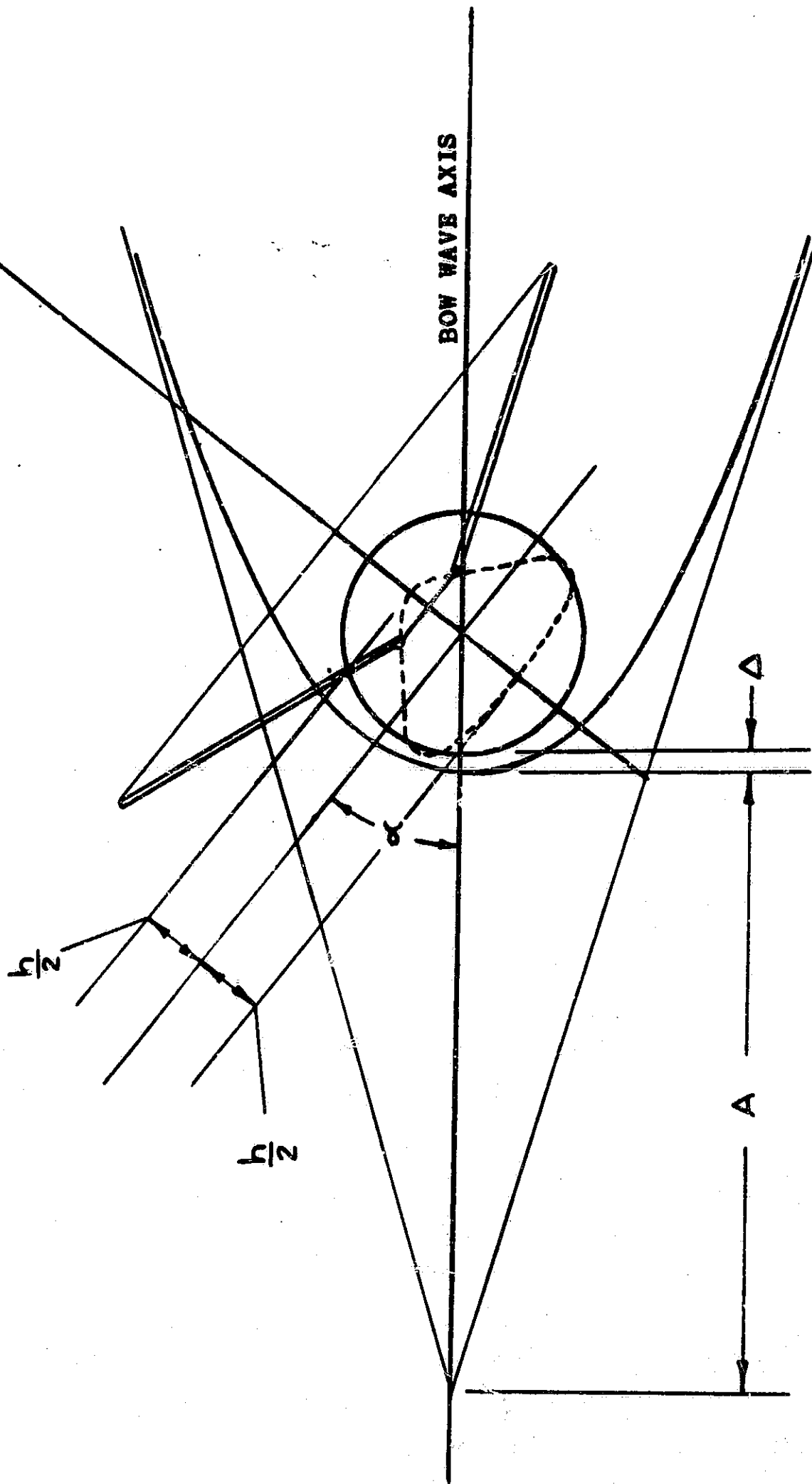


Figure 12. Configuration For Approximating Bow Shock Wave

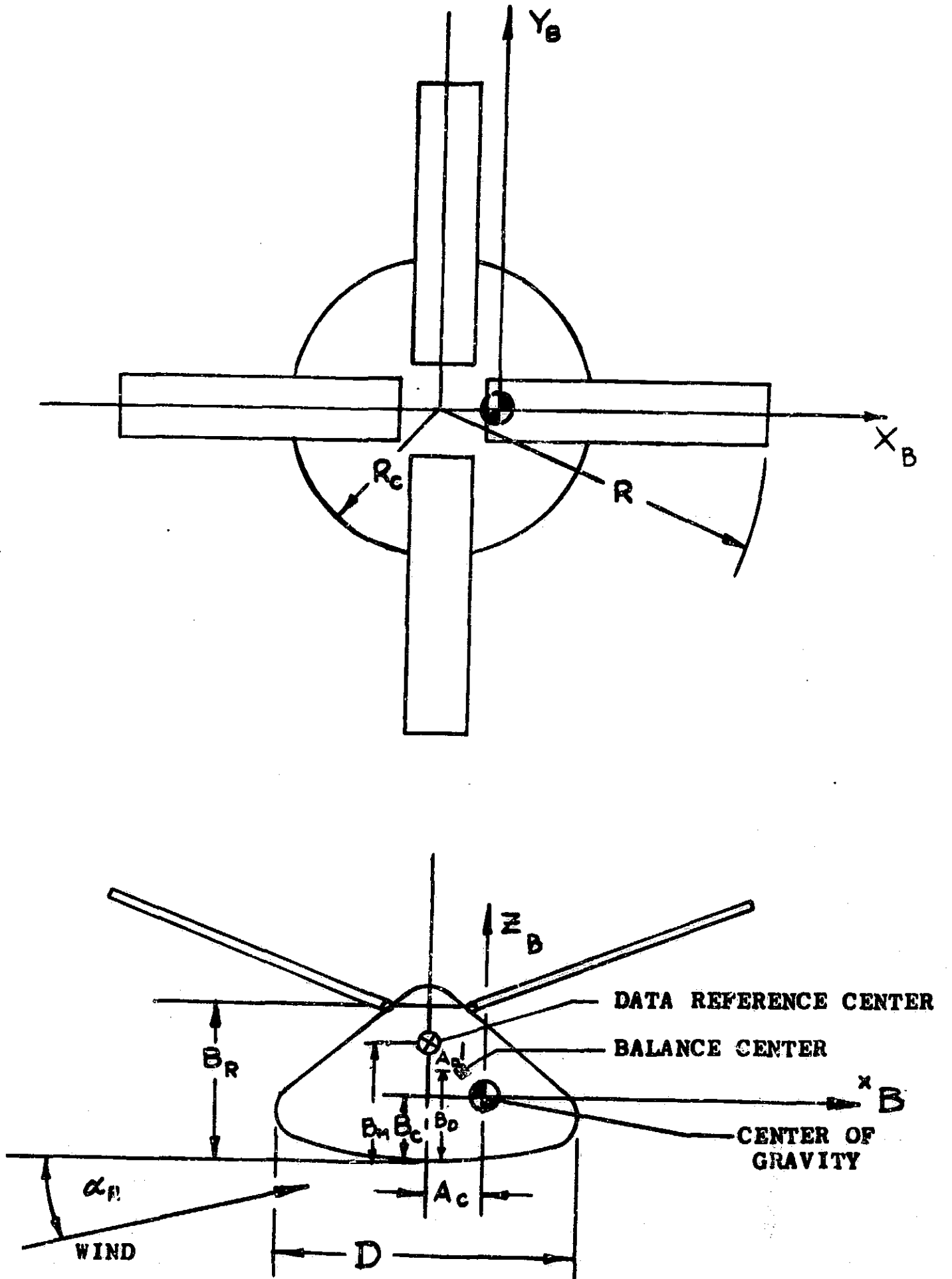


Figure 13. Vehicle Configuration For Dynamics Study

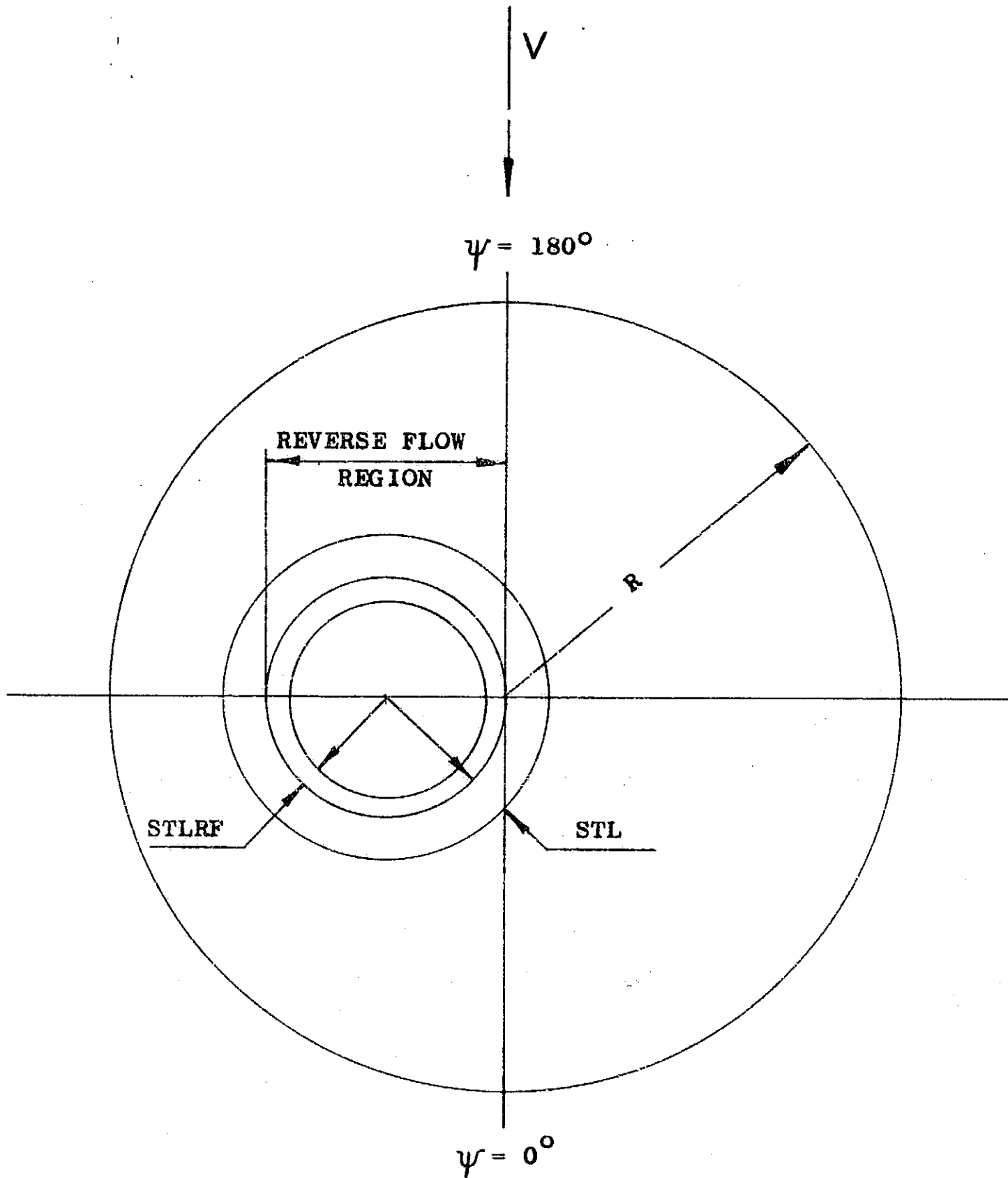


Figure 14. Stall And Reverse Flow Regions For Linear Analysis

## REFERENCES

1. Lemnios, A. Z., and Giansante, N.: The Dynamic Behavior of Rotor Re-Entry Vehicle Configurations, Volume I.
2. Gessow, A., and Myers, G. C. Jr.: Aerodynamics of the Helicopter.

APPENDIX A  
INPUT LISTING FOR  
ROTOR RE-ENTRY VEHICLE (REV)  
COMPUTER PROGRAMS

See Note 1 For Tape, Card Reader, Printer Assignments, And Definitions Of Program Controls NSTART, NSTAB, KNTRL, NCHK. Card format for REVOL control parameters is (4110).

Card	1	Columns	1-5	NØPT	Program Option Control (See Note 2)
			6-10	NØCYCL	Number Of Cycles In Time History Calculation
			11-20	BCINIT(1)	θ <sub>0</sub> Unit Step Initial Condition
			21-30	BCINIT(2)	"
			31-40	BCINIT(3)	"
			41-50	BCINIT(4)	"
			51-60	BCINIT(5)	"
			61-70	BCINIT(6)	"

Note: Prime On Variable Indicates Differentiation With Respect To Azimuth

$$\frac{d(\quad)}{d\psi} = \frac{1}{\Omega} \frac{d(\quad)}{dt}$$

Card	2	Columns	1-5	NCASE	Case Identification Number
			6-80 <th>HEAD</th> <th>Case Description</th>	HEAD	Case Description
			1-10 <td>R</td> <td>Rotor Radius (Ft)</td>	R	Rotor Radius (Ft)
			11-20 <td>E1</td> <td>Lag Hinge Offset (Ft)</td>	E1	Lag Hinge Offset (Ft)
			21-30 <td>E2</td> <td>Flapping Hinge Offset (Ft) (See Note 3)</td>	E2	Flapping Hinge Offset (Ft) (See Note 3)
			31-40 <td>AMSI(1)</td> <td>Blade Mass (Slugs)</td>	AMSI(1)	Blade Mass (Slugs)
			41-50 <td>AMSI(2)</td> <td>Blade Flapping Static Moment (Slug-Ft)</td>	AMSI(2)	Blade Flapping Static Moment (Slug-Ft)
			51-60 <td>AMSI(5)</td> <td>Blade Flapping Moment Of Inertia (Slug-Ft<sup>2</sup>)</td>	AMSI(5)	Blade Flapping Moment Of Inertia (Slug-Ft <sup>2</sup> )
			61-70 <td>AMSI(8)</td> <td>Blade Feathering Moment Of Inertia (Slug-Ft<sup>2</sup>)</td>	AMSI(8)	Blade Feathering Moment Of Inertia (Slug-Ft <sup>2</sup> )
			1-10 <td>NXF</td> <td>Number Of Aerodynamic Blade Stations (≤ 10)</td>	NXF	Number Of Aerodynamic Blade Stations (≤ 10)
			11-20 <td>FCNSP</td> <td>Feathering Control Spring Rate (Ft-Lb/Rad)</td>	FCNSP	Feathering Control Spring Rate (Ft-Lb/Rad)
			21-30 <td>AKTZ</td> <td>Feathering - Lag Feedback Ratio, ∂θ/∂ξ</td>	AKTZ	Feathering - Lag Feedback Ratio, ∂θ/∂ξ
			31-40 <td>ALAMO</td> <td>Steady Inflow Ratio</td>	ALAMO	Steady Inflow Ratio
			41-50 <td>ALL</td> <td>Minimum Angle Of Attack Used In Subroutine INTANG</td>	ALL	Minimum Angle Of Attack Used In Subroutine INTANG
			51-60 <td>ALH</td> <td>Maximum Angle Of Attack Used In Subroutine INTANG</td>	ALH	Maximum Angle Of Attack Used In Subroutine INTANG
			61-70 <td>DELAL</td> <td>Angle Of Attack Increment Used In Subroutine INTANG</td>	DELAL	Angle Of Attack Increment Used In Subroutine INTANG

Note: ALL, ALH, DELAL are used in conjunction with subroutine INTANG. This subroutine supplies angles of attack in integer form, as a function of radial station, for contour plots.

Card	5	Columns	1-10 11-20 21-30 31-40 41-50	NX NX1 NX2 NREF NAERØ	Total Number Of Blade Stations ( $\leq 16$ ) Number Of First Aerodynamic Station Number Of Last Aerodynamic Station Reference Axis Control (See Note 4) Aerodynamic Coefficients Control (See Note 5)
			51-60	NMØCK	Control On Rotor Shaft Angle Calculation NMØCK = 0 Calculate Shaft Angle Using Thrust Coefficient NMØCK $\neq$ 0 Calculate Shaft Angle Without Thrust Coefficient
Card(s)	6	Columns	1-10 11-20 21-30 31-40 41-50 51-60 61-70	X C FA CG THX EM AIC	Blade Radial Station (Ft) Blade Chord (Ft) Feathering Axis Aft Of Leading Edge (Ft) CG Aft Of F.A. (NREF-1) Or L.E. (NREF=2) (Ft) Blade Twist Referenced To .75R (Rad) Radial Mass Distribution (Slug/Ft) Feathering Inertia Distribution (Slug-Ft <sup>2</sup> /Ft)
					Note: This card is to be repeated NX times in root to tip order. 16 cards maximum.
Card	7	Columns	1-10 11-20 21-30 31-40 41-50 51-60 61-70 71-80	AMU ØMEGA ALT NP AKTB FSPRNG BSPRNG ZSPRNG	Advance Ratio Rotor Speed (Rad/Sec) Altitude (Ft) Number Of Azimuth Stations ( $\leq 24$ ) Feathering-Flapping Feedback Ratio, $\partial\theta/\partial\beta$ Feathering Root Spring (Ft-Lb/Rad) Flapping Root Spring (Ft-Lb/Rad) Lagging Root Spring (Ft-Lb/Rad)
Card	8	Columns	1-10 11-20 21-30	FDAMP BDAMP ZDAMP	Feathering Damper (Ft-Lb/Rad/Sec) Flapping Damper (Ft-Lb/Rad/Sec) Lagging Damper (Ft-Lb/Rad/Sec)

Card	9	Columns	1-10	NM	No. Of Mach Numbers Used In Linear Analysis And In Definition Of Shockwave Shape Factors ( $\leq 10$ )
			11-20	STL	See Note 6
			21-30	STLRF	See Note 6
Card(s)	10	Columns	1-10	AMCH	Mach Numbers Used In Linear Analysis
			11-20	A0	Normal Force Curve Slope (1/Deg)
			21-30	CDSLPL	Chord Force Curve Slope (1/Deg)
			31-40	CMSLPL	Pitching Moment Curve Slope (1/Deg)
			41-50	CLREF	Normal Force Coefficient (Reference For A0)
			51-60	CDO	Chord Force Coefficient (Reference For CDSLPL)
			61-70	CMO	Pitching Moment Coefficient (Reference For CMSLPL)
Note: This card is to be repeated NM times starting at the lowest Mach number and monotonically increasing. 10 cards maximum.					
Card(s)	11	Columns	1-10	ALOL	Angle Of Attack At CLREF (Deg)
			11-20	ADOD	Angle Of Attack At CDO (Deg)
			21-30	AMOM	Angle Of Attack At CMO (Deg)
			31-40	CLAD	Non-Steady Lift Coefficient (1/Deg/Sec)
			41-50	CMTAD	Non-Steady Moment Coefficient (1/Deg/Sec)
See note under card 10.					
Card(s)	12	Columns	1-10	SAO	These Variables Are Similar To Those Defined On Card 10, Columns 11 Thru 70 Inclusive, Except They Define The Stalled Flow Region
			11-20	SCDSLPL	
			21-30	SCMSLPL	
			31-40	SCLREF	
			41-50	SCDO	
			51-60	SCMO	
See note under card 10.					
Card(s)	13	Columns	1-10	SALOL	These Variables Are Similar To Those Defined On Card 11, Except They Define The Stalled Flow Region
			11-20	SADOD	
			21-30	SAMOM	
			31-40	SCLAD	
			41-50	SCMTAD	
See note under card 10.					

Card(s)	14 Columns	1-10	RAO	These Variables Are Similar To Those Defined On Card 10, Columns 11 Thru 70 Inclusive, Except They Define The Reversed Flow Region
		11-20	RCDSL P	
		21-30	RCMSLP	
		31-40	RCLREF	
		41-50	RCDO	
		51-60	RCMO	
			See note under card 10.	
Card(s)	15 Columns	1-10	RALOL	These Variables Are Similar To Those Defined On Card 11, Except They Define The Reversed Flow Region
		11-20	RADOD	
		21-30	RAMOM	
		31-40	RCLAD	
		41-50	RCMTAD	
			See note under card 10.	
Card	16 Columns	1-10	NITB	Limiting Number Of Iterations On Flapping, Feathering And Lagging Equilibrium
		11-20	ILAM	Control On Inflow ILAM = 0 Uniform Inflow Distribution ILAM ≠ 0 Inflow Distribution Read From Cards
		21-30	NIØM	Limiting Number Of Iterations For Torque Equilibrium
		31-40	LFAR	Control On Shaft Angle Of Attack LFAR = 1 Shaft Angle Of Attack = 0° (Defined Internally) LFAR = 2 Shaft Angle Of Attack = 90° (Defined Internally) LFAR = 3 Program Calculates Shaft Angle Of Attack
		41-50	LSS2	Print Control LSS2 = 0 Print At Each Iteration: Distributions Of Flapping, Feathering, And Lagging Displacements, And Velocities; Distributions Of Angles Of Attack And Mach Numbers LSS2 ≠ 0 No Print

51-60	LCØN	Control Of Supersonic Inflow Subroutine And Data Input LCØN = 0	Read Input Parameters Defining Capsule Bow Wave Shape; Also Calculate Capsule Bow Wave-Rotor Cone Intersection And Corresponding Inflow Distribution Using INFLOW Subroutine
61-70	IDYN	LCØN ≠ 0 IDYN = 0 IDYN ≠ 0	Aforementioned Data And Calcula- tions Omitted Omit Dynamic Stability Data Include Dynamic Stability Data (See Note 15)
71-80	ITEST	ITEST = 1 ITEST = 2	Calculate VFREE And W From Loads Initially Use VFREE And W From Previous Step Or Tape
1-10	TOA		Static Blade Feathering Angle at .75R (Deg)
11-20	BOA		Static Blade Coning Angle (Deg)
21-30	ZOA		Static Lag Angle (Deg)
31-40	APHASE		Input Phase Angle (Deg) (See Note 7)
41-50	PIRA		Rotor Hub Pitch Rate (Rad/Sec)
51-60	RØRA		Rotor Hub Roll Rate (Rad/Sec)
61-70	SIDSLP		Initial Body Sideslip Angle (Deg)
1-10	AOS		Collective Pilot Input (Deg)
11-20	A1S		Longitudinal Cyclic Input (Deg) (See Note 14)
21-30	B1S		Lateral Cyclic Input (Deg)
31-40	BTØL		Percentage Tolerance (In Decimal Form) On $\beta$ , $\beta'$ , $\theta$ , $\theta'$ , $\gamma$ , $\gamma'$
41-50	ATØLB		Absolute Tolerance On Above Parameters
51-60	CQTØL		Absolute Tolerance On Torque (Ft-Lbs)
ALAM1, 1			Non-Dimensional Inflow Distribution
ALAM2, 1			Eight Values Per Card, 10 Columns Per Value (8F 10.4 Format). Maximum Of 36 Cards.
ALAM1, 2			First Subscript Denotes Aerodynamic Blade Station, Root To Tip Order. Second Subscript Denotes Azimuth Station, Monotonically Increasing
ALAM2, 2			
ALAMNxF+2, 1			
ALAMNxF+2, 2			
ALAMNxF+2, NP			

Note: These cards are omitted if ILAM = 0. See Note 8.

Card	20	Columns	1-68	HEAD1	Dynamic Stability Condition Description
Card	21	Columns	1-10	TØL(1)	Absolute Tolerance On Rotor Angle Of Attack (Radians)
	11-20			TØL(2)	Absolute Tolerance On Advance Ratio
	21-30			TØL(3)	Absolute Tolerance On Inflow Ratio
	31-40			TØL(4)	Absolute Tolerance On Rotor Angular Velocity (Rad/Sec)
	41-50			TØL(5)	Percent Tolerance On Rotor Angle Of Attack (In Decimal Form)
	51-60			TØL(6)	Percent Tolerance On Advance Ratio (In Decimal Form)
	61-70			TØL(7)	Percent Tolerance On Inflow Ratio (In Decimal Form)
	71-80			TØL(8)	Percent Tolerance On Angular Velocity (In Decimal Form)
Card	22	Columns	1-2	01	Card Count For Dynamic Stability Data
	11-20			INPUT(1,1)	Free Stream Mach Number
	31-40			INPUT(1,3)	Capsule Diameter (Ft) (See Figure 13)
	41-50			INPUT(1,4)	Gravitational Acceleration (Ft/Sec <sup>2</sup> )
Card	23	Columns	1-2	02	Card Count For Dynamic Stability Data
	11-20			INPUT(2,1)	Body Dimension "A" In XZ-Plane From Rotor Axis To Body Center Of Gravity. Positive For Center Of Gravity Aft Of Rotor Z Axis (Ft) (See Figure 13)
	21-30			INPUT(2,2)	Body Dimension "BC" In XZ-Plane, Measured From Body Lower Surface To Body Center Of Gravity. Positive Up (Ft) (See Figure 13)
	31-40			INPUT(2,3)	M-Body Mass (Slugs)
	41-50			INPUT(2,4)	IX - Body Moment Of Inertia About Body Center Of Gravity (Slug-Ft <sup>2</sup> )
	51-60			INPUT(2,5)	IY - Body Moment Of Inertia About Body Center Of Gravity (Slug-Ft <sup>2</sup> )

61-70	INPUT(2,6)	IZ - Body Moment Of Inertia About Body Center Of Gravity (Slug-Ft <sup>2</sup> )
71-80	INPUT(2,7)	JXZ - Body Product Of Inertia About Body Center Of Gravity (Slug-Ft <sup>2</sup> )
1-2	03	Card Count On Dynamic Stability Data
3-10	IN(3)	Number Of Blades
11-20	INPUT(3,1)	Blade Flapping Hinge Offset (Ft)
21-30	INPUT(3,2)	Rotor Blade First Mass Moment About Center Line Of Rotation Slug (Ft)
31-40	INPUT(3,3)	Rotor Polar Moment Of Inertia (Slug-Ft <sup>2</sup> )
41-50	INPUT(3,4)	Body Dimension "BR" Measured From Body Lower Surface To The Rotor Hub (See Figure 13)
1-2	04	Card Count For Dynamic Stability Data
41-50	INPUT(4,4)	Initial Body Roll Rate (Rad/Sec)
51-60	INPUT(4,5)	Initial Body Pitch Rate (Rad/Sec)
61-70	INPUT(4,6)	Initial Body Yaw Rate (Rad/Sec)
71-80	INPUT(4,7)	Initial Rotor Angular Velocity (Rad/Sec)
1-2	05	Card Count For Dynamic Stability Data
11-20	INPUT(5,1)	Initial Rotation Of Body X Axis With Respect To Earth Axis (Radians)
21-30	INPUT(5,2)	Initial Rotation Of Body Y Axis With Respect To Earth Axis (Radians)
31-40	INPUT(5,3)	Initial Rotation About Body Z Axis With Respect To Earth Axis (Radians)
41-50	INPUT(5,4)	Initial Displacement Of Body X Axis (Ft)
51-60	INPUT(5,5)	Initial Displacement Of Body Y Axis (Ft)
61-70	INPUT(5,6)	Initial Displacement Of Body Z Axis (Ft)

Note: If INPUT(5,2)  $\neq$  0, set INPUT(5,2) =  $\alpha_R$   
 If INPUT(5,3)  $\neq$  0, set INPUT(5,3) = SIDS LP  
 If INPUT(5,2) and/or INPUT(5,3) are set = 0, they are set to  $\alpha_R$  and SIDS LP within the program.

Card	27	Columns	1-2	07	Card Count For Dynamic Stability Data
			11-20	INPUT(7,1)	Initial Time For Dynamic Stability Calculations (Seconds)
			21-30	INPUT(7,2)	Final Time For Dynamic Stability Calculations (Seconds)
			31-40	INPUT(7,3)	Time Increment For Dynamic Stability Calculations (Seconds)

Card	28	Column	1-2	10	Card Count For Dynamic Stability Data
Card	29	Columns	1-10	MACH1	Mach Number Below Free Stream Mach Number
			11-20	BM1	Vertical Offset Between Heat Shield Center And Data Reference Center (Ft)
			21-30	BD1	Vertical Offset Between Heat Shield Center And Vehicle Balance Center (Ft)
			31-40	AD1	Longitudinal Offset Between Rotor Shaft And Vehicle Balance Center (Ft)

Card	30	Columns	1-10	BØDYF(1,1,1)	Angle Of Attack Used To Define Body Aerodynamic Data (Degrees)
			11-20	BØDYF(1,2,1)	Body Lift Coefficient Corresponding To Angle Of Attack In Columns 1-10
			21-30	BØDYF(1,3,1)	Body Drag Coefficient Corresponding To Angle Of Attack In Columns 1-10
			31-40	BØDYF(1,4,1)	Body Pitching Moment Coefficient Corresponding To Angle Of Attack In Columns 1-10

Note: Reference area for body aerodynamic coefficients is the body cross-sectional area. (AREA =  $\pi/4$  INPUT(1,3)<sup>2</sup>. Card 33 is repeated for each angle of attack at MACH1 up to a maximum of 20 cards, with angles of attack monotonically increasing. See Note 9.

Card	31				Blank Card
Card	32	Columns	1-10	MACH2	Mach Number Above Free Stream Mach Number

Card	33	Columns	1-10	BØDYF(1,1,2)	Angle Of Attack Used To Define Body Aerodynamic Data At Mach Number Above Free Stream Mach Number (Degrees)
	11-20	BØDYF(1,2,2)			Body Lift Coefficient Corresponding To Angle Of Attack In Columns 1-10
	21-30	BØDYF(1,3,2)			Body Drag Coefficient Corresponding To Angle Of Attack In Columns 1-10
	31-40	BØDYF(1,4,2)			Body Pitching Moment Coefficient Corresponding To Angle Of Attack In Columns 1-10

Note: Card 33 is repeated for each angle of attack at MACH2 up to a maximum of 20 cards, with angles of attack monotonically increasing and being identically equal to those for MACH1. See Note 9.

Card	34				Blank Card
Card	35	Column	1-2	11	Last Card For Dynamic Stability Data
Card	36	Columns	1-10	NØAL	Number Of Angles Of Attack For Airfoil Data ( $\leq 48$ )
	11-20	NØMN			Number Of Mach Numbers For Airfoil Data ( $\leq 8$ )
	21-30	NØSEC			Number Of Blade Stations For Airfoil Data ( $\leq 6$ )

Card(s)	37	ALFA1	Angle Of Attack (Degrees) Used To Define Airfoil Data
		ALFA2	Eight Values Per Card, 10 Columns Per Value (8F 10.4 Format), Maximum Of 6 Cards
		.	
		.	
		.	
		ALFA NØAL	

Card	38	AMACH1	Mach Numbers Used To Define Airfoil Data
		AMACH2	Eight Values Per Card, 10 Columns Per Value (8F 10.4 Format), Maximum Of Eight Values, One Card
		.	
		.	
		AMACHNØMN	

Card	39	RADN <sub>1</sub>	Blade Stations (Ft) Used To Define Airfoil Data
		RADN <sub>2</sub>	10 Columns Per Value (8F 10.4 Format)
		.	Maximum Of Six Values, One Card
		.	
		RADN <sub>NØSEC</sub>	
Card	40	ASTLP <sub>1</sub>	Positive Stall Angles (Degrees) At Each Mach Number; At Angles Of Attack Above ASTLP, Lowest Mach Number Data Are Used
		.	Eight Values Per Card, 10 Columns Per Value (8F 10.4 Format)
		.	
		ASTLP <sub>NØMN</sub>	
Card	41	ASTLN <sub>1</sub>	Negative Stall Angles (Degrees) At Each Mach Number; At Angles Of Attack Below ASTLN, Lowest Mach Number Data Are Used
		ASTLN <sub>2</sub>	Eight Values Per Card, 10 Columns Per Value (8F 10.4 Format)
		.	
		ASTLN <sub>NØMN</sub>	
Card	42	X0	Blade Root Cutout Station (Ft)
		FCPO	Blade Radial Flow Correction For Torque (Non-Dimensional)
		FCHO	Blade Radial Flow Correction For H-Force (Non-Dimensional)
		BL	Number Of Blades
		XC4	Airfoil Data Reference Axis (See Note 10)
		CDOR	Drag Coefficient Of Blade Retention Area
		CRET	Chord Of Blade Retention Area (Ft)
Card	43	INTAN	Control On Integer Angles Of Attack (See Note 11)
		NHARB	Control On Harmonic Analysis (See Note 12)
		NØHAR	Control On Harmonic Analysis (See Note 13)

Card	44	Columns	1-10	BEQ	Height Of Rotor Plane Above Center Of Equivalent Sphere (Ft)
			11-20	REQ	Equivalent Body Radius (Ft)
			21-30	AMINF	Free Stream Mach Number
			31-40	UR	Universal Gas Constant (Ft/°R)
			41-50	GAMM	Ratio Of Specific Heats

Card(s)	45	AMDØR <sub>1</sub>	Mach Numbers Defining Shock Wave Shape Factors
		AMDØR <sub>2</sub>	Eight Values Per Card, 10 Columns Per Value (8F 10.4 Format). Maximum Of 2 Cards

AMDØR<sub>NM</sub>

Note: These Mach numbers are not required to be identical to those (AMCH) used in the linear analysis.

Card(s)	46	XØR <sub>1</sub>	Ratio Of The Distance Between The Mach Cone Vertex And The Hyperbolic Shock Vertex To The Equivalent Body Radius
		XØR <sub>2</sub>	
		.	
		.	
		.	
		XØR <sub>NM</sub>	Eight Values Per Card, 10 Columns Per Value (8F 10.4 Format). Maximum Of 2 Cards (XØR = A/Rc. See Figure 12)

Card(s)	47	DØR <sub>1</sub>	Ratio Of The Distance Between Hyperbolic Shock Wave And The Equivalent Body Sphere To The Sphere Radius. Eight Values Per Card, 10 Columns Per Value (8F 10.4 Format). Maximum Of 2 Cards (DØR = Δ/Rc. See Figure 12)
		DØR <sub>2</sub>	
		.	
		DØR <sub>NM</sub>	

Note: See Page 15, Volume 1, for tabulated values of A/R<sub>c</sub> and Δ/R<sub>c</sub> versus M

Card(s) 48

CL<sub>1</sub>, 1, 1  
CL<sub>2</sub>, 1, 1  
.  
.  
.

Airfoil Section Lift Coefficient  
Tabulated Versus Angle Of Attack,  
Mach Number, Radius  
Eight Values Per Card, 10 Columns  
Per Value (8F 10.4 Format). Maximum  
Of 288 Cards

CL<sub>NØAL</sub>, 1, 1  
CL<sub>1</sub>, 2, 1  
.

First Subscript = Airfoil Angle Of Attack  
Second Subscript = Mach Number  
Third Subscript = Blade Radial Station  
For Aerodynamic Data

CL<sub>NØAL</sub>, NØMN, 1  
CL<sub>1</sub>, 1, 2  
.  
.  
.

CL<sub>NØAL</sub>, NØMN, NØSEC

Card(s) 49

CD<sub>1</sub>, 1, 1  
CD<sub>2</sub>, 1, 1  
.  
.  
.

Airfoil Section Drag Coefficient  
Tabulated Versus Angle Of Attack,  
Mach Number, Radius  
Eight Values Per Card, 10 Columns Per  
Value (8F 10.4 Format). Maximum Of  
288 Cards

CD<sub>NØAL</sub>, 1, 1  
CD<sub>1</sub>, 2, 1  
.  
.

First Subscript = Airfoil Angle Of Attack  
Second Subscript = Mach Number  
Third Subscript = Blade Radial Station  
For Aerodynamic Data

CD<sub>NØAL</sub>, NØMN, 1  
CD<sub>1</sub>, 1, 2  
.  
.  
.

CD<sub>NØAL</sub>, NØMN, NØSEC

50 Card(s) 50

Airfoil Section Pitching Moment  
Coefficient Referenced To An Axis  
At C(.25 + XC4)  
Eight Values Per Card, 10 Columns Per  
Value (8F 10.4 Format). Maximum Of  
288 Cards  
First Subscript = Airfoil Angle Of Attack  
Third Subscript = Blade Radial Station  
For Aerodynamic Data

CM<sub>1</sub>, 1, 1  
CM<sub>2</sub>, 1, 1  
.  
.  
.

CM<sub>NØAL</sub>, 1, 1  
CM<sub>1</sub>, 2, 1  
.  
.

CM<sub>NØAL</sub>, NØMN, 1  
CM<sub>1</sub>, 1, 2  
.  
.

CM<sub>NØAL</sub>, NØMN, NØSEC  
.  
.

Note: Airfoil data omitted if NAERO ≠ 0

Notes:

1. All integer variables (i.e. variables beginning with letters I-N) must be right justified with no decimal point.

L1	FORTMAN	Symbol	For	Card	Reader				
L2	FORTMAN	Symbol	For	Printer					
L3	FORTMAN	Symbol	For	Tape 1	(Working Tape)	Binary	Tape		
L4	FORTMAN	Symbol	For	Tape 2	(Working Tape)	"			
L5	FORTMAN	Symbol	For	Tape 3	(Working Tape)	"			
L6	FORTMAN	Symbol	For	Tape 4	(Working Tape)	"			
L7	FORTMAN	Symbol	For	Tape 5	(Working Tape)	"			
L8	FORTMAN	Symbol	For	Tape 6	(Working Tape)	"			

Card 0 (Precedes Card 1)

Columns 1-10	NSTART	Control for user reentry into program. Anytime program is user terminated for future execution with NSTART, Tapes L3, L4, L5, L6, L7, L8 must be saved.
11-20	NCHK	NCHK $\neq$ 0 Torque Equilibrium Not Achieved, Program Returns to REV05. NCHK = 0 Torque Equilibrium Achieved, Program Continues
21-30	KNTRL	Program control for return to REV03 or REV07 after initial convergence on rotor torque equilibrium. KNTRL $\neq$ 0 Shock wave parameters are to be calculated KNTRL = 0 Shock wave parameters are not to be calculated. Program proceeds to REV07 (via NSTAB).
31-40	NSTAB	Program control for entry into dynamic stability portion of program. NSTAB = 0 Execution of dynamic stability and no torque iteration. NSTAB > 0 Execute dynamic stability and torque iteration. NSTAB < 0 Torque iteration and no dynamic stability.

2. NØPT controls the options for calculating time histories and/or loads.

NØPT = 1 Time History (Stability) Only  
 NØPT = 2 Load Calculation Only  
 NØPT = 3 Time History (Stability) And Load Calculation

3. Flapping hinge is coincident with or outboard of lagging hinge ( $E2 > E1$ ).

4. Control indicating reference axis for chordwise center of gravity location and feathering inertia distribution.

NREF = 1 Reference Is Feathering Axis  
 NREF = 2 Reference Is Blade Leading Edge

5. Control on method for calculation of aerodynamic coefficients.

NAERØ = 0 Use Tabular Data  
 NAERØ ≠ 0 Use Analytical Approach (Subroutine AERDAT)  
 Note: AERDAT is user supplied subroutine which would supply aerodynamic data using an analytical method.

6. STL and STLRF define a stall band for the linear analysis. The stall band uses the reverse flow region circle as the generating line and is described by adding STL and STLRF (negative quantity) to this line as shown in Figure 14.

7. Azimuth angle at which pilot rotor control is initiated; measured with respect to 90° azimuth position.

8. NXF stations are input, but the lagging hinge station and flapping hinge station are considered as additional stations by the program. Therefore NXF+2 input quantities are required.

9. The Dynamic Stability Data, subscripts for BØDYF(I, J, K) are

First subscript = Body angle of attack  
 Second subscript = Body forces at specified angle of attack  
 Third subscript = Free stream Mach number

10. Airfoil data reference axis, percent chord (in decimal form), measured with respect to C/4 - positive aft.

11. Control on calculation of integer angles of attack versus blade radius; used to define contour plots.

INTAN = 0 No Calculation  
INTAN  $\neq$  0 Angles Are Calculated

12. Contour on harmonic analysis of flapping and feathering angles.

NHARB = 0 No Harmonic Analysis  
NHARB > 0 Angles Are Harmonically Analyzed  
NHARB is the number of harmonics to be calculated.

13. Contour on harmonic analysis of all airloads distributions.

NØHAR = 0 No Harmonic Analysis  
NØHAR > 0 Airloads Are Harmonically Analyzed  
NØHAR is the number of harmonics to be calculated.

14.  $\theta$  INPUT = AOS-ALS(Cos( $\psi$  + APHASE)) - BIS(Sin( $\psi$  + APHASE)).

15. If IDYN = 0, omit cards 20-35 inclusive.

APPENDIX B  
OUTPUT SYMBOL DEFINITION SUPPLEMENT FOR  
ROTOR RE-ENTRY VEHICLE (REV)  
COMPUTER PROGRAMS

## REV PROGRAM

### OUTPUT SYMBOOL DEFINITION

The major portion of the output symbols are defined in Appendix A wherein the input for the Rotor Re-Entry Vehicle Program is listed. The remaining output symbols are defined below.

T	Rotor blade feathering angle transient response.
TP	Rotor blade feathering angular velocity transient response.
Z	Rotor blade lag angle transient response.
ZP	Rotor blade lag angular velocity transient response.
B	Rotor blade flapping angle transient response.
BP	Rotor blade flapping velocity transient response.
<u>Note:</u>	T, TP, Z, ZP, B, BP are linear transient responses due to an initial unit step for any or all of these parameters.
PSI	Rotor blade azimuth station, degrees.
R	Rotor blade radius, Ft.
E	Rotor blade flapping hinge offset from center line of rotation, Ft.
II	Rotor blade flapping moment of inertia about flapping hinge, slug-ft <sup>2</sup> .
MU	Advance ratio.
LAMBDA	Inflow ratio.
THETA 0 (Steady)	Pilot collective pitch angle input, degrees.
THETA 1	Cosine component of pilot pitch angle input, degrees.
THETA 1 (Sin)	Sine component of pilot pitch angle input, degrees.

CP Factor	Blade radial flow correction factor which appears in rotor torque equation.
CH Factor	Blade radial flow correction factor which appears in rotor H force expression.
BETA	Rotor blade flapping angle response, rad.
THETA	Rotor blade feathering angle response, rad.
LAG ANGLE	Rotor blade lagging angle response, rad.

APPENDIX C  
FORTAN LISTINGS FOR  
ROTOR RE-ENTRY VEHICLE (REV)  
COMPUTER PROGRAMS

C	REV MAIN PROGRAM	RV1	1
C	*****	RV1	2
C		RV1	3
C		RV1	4
C	MAIN PROGRAM FOR REV PROGRAM	RV1	5
C		RV1	6
C	*****	RV1	7
C	COMMON L1, L2, L3, L4, L5, L6, L7, L8, NCHK	RV1	8
	CALL TAPE	RV1	9
	READ ( L1,100) NSTART,NCHK,KNTRL,NSTAB	RV1	10
100	FORMAT (4I10)	RV1	11
	GO TO (110,110,120,130,140,150,210), NSTART	RV1	12
110	CALL REV02	RV1	13
120	CALL REV03	RV1	14
130	CALL REV04	RV1	15
140	CALL REV05	RV1	16
150	CALL REV06	RV1	17
	IF (NSTAB) 160,210,160	RV1	18
160	IF (NCHK) 140,170,140	RV1	19
170	IF (KNTRL) 180,190,180	RV1	20
180	KNTRL = 0	RV1	21
	GO TO 120	RV1	22
190	IF (NSTAB) 220,210,200	RV1	23
200	NSTAB = 0	RV1	24
210	CALL REV07	RV1	25
	GO TO 120	RV1	26
220	STOP	RV1	27
	END	RV1	28
		RV1	29

	SUBROUTINE TAPE		TPE	1
C			TPF	2
C	THIS SUBROUTINE ESTABLISHES ASSIGNMENTS FOR I/O DEVICES.		TPE	3
C	L1 FORTRAN SYMBOL FOR CARD READER		TPF	4
C	L2 FORTRAN SYMBOL FOR CARD PRINTER		TPE	5
C	L3 FORTRAN SYMBOL FOR TAPE 1 (WORKING TAPE) BINARY TAPE		TPE	6
C	L4 FORTRAN SYMBOL FOR TAPE 2 (WORKING TAPE) BINARY TAPE		TPE	7
C	L5 FORTRAN SYMBOL FOR TAPE 3 (WORKING TAPE) BINARY TAPE		TPE	8
C	L6 FORTRAN SYMBOL FOR TAPE 4 (WORKING TAPE) BINARY TAPE		TPF	9
C	L7 FORTRAN SYMBOL FOR TAPE 5 (WORKING TAPE) BINARY TAPE		TPF	10
C	L8 FORTRAN SYMBOL FOR TAPE 6 (WORKING TAPE) BINARY TAPE		TPE	11
C			TPE	12
	COMMON L1, L2, L3, L4, L5, L6, L7, L8, NCHK		TPE	13
	L1 =		TPE	14
	L2 =		TPE	15
	L3 =		TPE	16
	L4 =		TPE	17
	L5 =		TPF	18
	L6 =		TPE	19
	L7 =		TPF	20
	L8 =		TPE	21
	RETURN		TPF	22
	END		TPE	23



```

577)
  READ (L1,190) (X(I),C(I),FA(I),CG(I),THX(I),FM(I),AIC(I),I=1,NX)
  WRITE (L2,210) (X(I),C(I),FA(I),CG(I),THX(I),FM(I),AIC(I),I=1,NX)
  E21 = F2-F1
  X1=E1/R
  X2=E2/R
  DO 110 J=1,NX
  X(J) = X(J)*12.0
  C(J) = C(J)*12.0
  FA(J) = FA(J)*12.0
  CG(J) = CG(J)*12.0
  FM(J) = FM(J)/12.0
110 AIC(J) = AIC(J)*12.0
C
C   READ AERODYNAMIC DATA AND CALCULATE C COLUMNS .
C
120 READ (L1,230) AMU,OMEGA,ALT,AP,AKTB,FSPRNG,BSPRNG,ZSPRNG,
1   FDAMP,BDAMP,ZDAMP
  READ(L1,260)NM,STL,STLRF,(AMCH(I),AO(I),CDSLPI(I),CMSLP(I),
  ICLREF(I),CDO(I),CMO(I),I=1,NM)
  READ(L1,130)(ALOL(I),ADOD(I),AMOM(I),CLAD(I),CMTAD(I),I=1,NM)
  READ (L1,140) (SAO(I),SCDSLPI(I),SCMSLP(I),SCLREF(I),SCDO(I),
  ISCMO(I),I=1,NM)
  READ(L1,130)(SALOL(I),SADOD(I),SAMOM(I),SCLAD(I),SCMTAD(I),I=1,NM)
  READ (L1,140) (RAO(I),RCDSLPI(I),RCMSLP(I),RCLREF(I),RCDO(I),
  IRCMO(I),I=1,NM)
  READ(L1,130)(RALOL(I),PADOD(I),RAMOM(I),RCLAD(I),RCMTAD(I),I=1,NM)
130 FORMAT(5F10.6)
140 FORMAT(6F10.6)
  WRITE (L2,240) AMU,OMEGA,ALT,AKTB,FSPRNG,BSPRNG,ZSPRNG,FDAMP,
1   BDAMP,ZDAMP
  WRITE (L2,250) STL,STLRF,
1   (AMCH(I),CMO(I),AO(I),ALOL(I),CDO(I),CLAD(I),CMTAD(I),I=1,NM)
150 FORMAT(2I5,6F10.5)
160 FORMAT(1H1,28X,33HTHREE DEGREES OF FREEDOM          ///15X,57H
1   CALCULATION OF INERTIAS          ///11X,9HCASE
2NO.=15,17A4///40X,36HINPUT DATA FOR OPTIONAL TIME HISTORY///25X,12H
3 FEATHERING,12X,3HLAG,15X,8HFLAPPING///6X,4HNOPT,4X,6HNOCYCL,5X,
4 2H T,8X,2HTP,9X,1HZ,8X,2HZP,9X,1HB,8X,2HBP/2I10,6F10.5//120H
5 TIME HISTORY (STABILITY) IS TO BE CALCULATED IN REV03 FOR
6 NUMBER OF CYCLES=NOCYCL,ONLY IF NOPT=1 OR NOPT=3///)
170 FORMAT( 17A4)
180 FORMAT(15,17A4)
190 FORMAT(7F10.4)
C
200 FORMAT(11C,7F10.4)
210 FORMAT (1H1,25H BLADE SECTION PROPERTIES,///109H          RADIUS,FT
1.   CHORD,FT.          F.A.,FT.          C.G.,FT.          TWIST,DEG.          M
2PASS,SL/FT.          IC,SL,FT.///(F17.4,6F15.4))
220 FORMAT(29H FEATHERING CONTROL SPRING =F10.2,11HFT.-LB/RAD.//8H A

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1KTZ =F10.6	RV2 101
2 //36H TOTAL(INERTIA INC. AERO.)STATIONS =I10,50H FIRST AERO	RV2 102
3DYNAMIC STATION NUMBER (RCOT-T0-TIP ORDER) =I10//27H LAST AERODYN	RV2 103
4AMIC NUMBER =I10//8H NREF =I2 ,95H =1 (FEATHERING AXIS) OR =2	RV2 104
5(LEADING EDGE), AS REFERENCE FROM WHICH CG AND IC ARE MEASURED .)	RV2 105
230 FORMAT(3F10.5,I10,4F10.3)	RV2 106
240 FORMAT(1H1,46X,23HAERODYNAMIC PARAMETERS//5H MU =F10.6,5X,7HOMEGA	RV2 107
1 =F10.5,7HRA0/SEC,5X,12H ALTITUDE =F10.0	RV2 108
2 //5X,5HAKTB=F10.6,5X,7HFSPRNG=F10.3,4X,7HBSPRNG=F10.3,4X,	RV2 109
37HZSPRNG=F10.3//5X,6HFDAMP=F10.5,5X,6HBDAMP=F10.5,5X,6HZDAMP=F10.3	RV2 110
4///)	RV2 111
250 FORMAT(30X,17HSTALL FROM UT =F10.6,5X,8HTO UT =F10.6	RV2 112
1 //42X,36HPARAMETERS FOR NORMAL-FLOW REGI	RV2 113
2ON//15H MACH NO.,10X,3HCP0,13X,2HAG,11X,4HALOL,12X,3HCO,11X	RV2 114
3,4HCLAD,12X,5HCHTAD//((TF15.6))	RV2 115
260 FORMAT(I10,2F10.5/(7F10.6))	RV2 116
READ (L1,990)INITB,ILAM,NICH,LFAR,LSS2,LCON,LDYN,ITEST	RV2 117
READ(L1,1000) TOA,BOA,ZOA,APHASE,PIRA,RORA,SIDSLP	RV2 118
SIDSLP = SIDSLP / 57.2958	RV2 119
TOA = TCA/57.2958	RV2 120
BOA = BOA/57.2958	RV2 121
ZOA = ZOA/57.2958	RV2 122
Q2=2.0*PIRA/OMEGA	RV2 123
P2=2.0*RORA/OMEGA	RV2 124
CALL AT62(ALT,ANS)	RV2 125
REFM=ANS(4)	RV2 126
RHO=ANS(1)/.002378	RV2 127
TIN=ANS(3)*1.8	RV2 128
READ (L1,1000) AOS,AIS,RIS,BTOL,ATOLB,CQTOL	RV2 129
NXF2 = NXF2	RV2 130
IF(ILAM) 290,270,290	RV2 131
270 DO 280 I=1,NP	RV2 132
DO 280 J=1,NXF2	2RV2 133
280 ALAM(J,I)=ALAM0	2RV2 134
GO TO 300	RV2 135
290 READ(L1,1000)((ALAM(J,I),J=1,NXF2),I=1,NP)	RV2 136
300 DO 310 J=1,NXF2	1RV2 137
DO 310 I=1,NP	2RV2 138
AMUC(J,I)=AMU	2RV2 139
310 RHOC(J,I)=RHO	2RV2 140
C ROTOCHUTE NON LINEAR STABILITY (RCSTAB)	RV2 141
C	RV2 142
ALAMFS=ALAM0	RV2 143
AMUFS=AMU	RV2 144
IF (IDYN) 320,640,320	RV2 145
320 NDIM=13	RV2 146
DO 330 I=1,11	1RV2 147
330 IN(I)=-1	1RV2 148
IN(6)=0	RV2 149
IN(8) = 0	RV2 150



FACTM=FACTL*INPUT(1,3)	RV2 201
CON=GM1-BD1	RV2 202
DO 560 J=1,NALPHA	1RV2 203
SOA=SIN(COEF(J,1)/57.2958)	1RV2 204
COA=COS(COEF(J,1)/57.2958)	1RV2 205
560 COEF(J,4)=COEF(J,4)-COEF(J,2)*(AD1*COA-CON*SOA)-COEF(J,3)*(CON*	1RV2 206
1COA&AD1*SOA)	RV2 207
G=INPUT(1,4)	RV2 208
A=INPUT(2,1)	RV2 209
BMC=RM1-INPUT(2,2)	RV2 210
M=INPUT(2,3)	RV2 211
IX=INPUT(2,4)	RV2 212
IY=INPUT(2,5)	RV2 213
IZ=INPUT(2,6)	RV2 214
JXZ=INPUT(2,7)	RV2 215
DD=IX*IZ-JXZ*JXZ	RV2 216
I1=JXZ*(IX-IY&IZ)/DD	RV2 217
I2=IZ*(IY-IZ)-JXZ*JXZ/DD	RV2 218
I3=IX*IZ/DD	RV2 219
I4=IZ*JXZ/DD	RV2 220
I5=(IZ-IX)/IY	RV2 221
I6=JXZ/IY	RV2 222
I7=JXZ/IZ	RV2 223
I8=(IX-IY)/IZ	RV2 224
R=INPUT(3,4)-INPUT(2,2)	RV2 225
IR=INPUT(3,3)	RV2 226
DO 570 I = 1,9	1RV2 227
DO 570 J = 1,13	2RV2 228
570 AA(I,J) = 0.0	2RV2 229
DO 580 I=1,7	1RV2 230
580 AA(1,I) = INPUT(4,I)	1RV2 231
DO 590 I=1,6	1RV2 232
590 AA(1,I&7) = INPUT(5,I)	1RV2 233
DO 600 I=1,4	1RV2 234
600 PRMT(I)=INPUT(7,I)	1RV2 235
ROTD = R * 2.0	RV2 236
WRITE (L2,610) HEAD,INPUT(1,1),ANS(1),INPUT(1,4),INPUT(1,3),	RV2 237
1 INPUT(2,3),ROTD,INPUT(3,2),INPUT(2,1),INPUT(2,2),INPUT(3,3),	RV2 238
2 INPUT(2,4),(INPUT(2,1),I= 4,7),(PRMT(I),I = 1,3)	RV2 239
610 FORMAT (1H1,50X,32HROTCHUTE STABILITY TIME HISTORY ,//,	RV2 240
1 17X,17A4,//,9X,13HMACH NUMBER = ,F7.2,17X,9HDENSITY = ,	RV2 241
2 F9.7,9H SL/FT CU ,17X,16HACC CF GRAVITY = ,F7.4,11H FT//SEC/SEC ,	RV2 242
3 //,29X,9HRCODY DATA ,55X,10HROTOR DATA ,//,9X,10HBODY DIA = ,F7.2	RV2 243
4 .12X,11HRCODY MASS = ,F7.2,3H SL ,16X,11HROTOR DIA = ,F7.2,3H FT ,	RV2 244
5 11X,6HSH = ,F7.2,6H SL FT ,//,13X,6HA = ,F7.2,3H FT ,13X,	RV2 245
6 7HRC = ,F7.2,3H FT ,21X,6HIR = ,F7.2,9H SL FT SQ ,5X,	RV2 246
7 6HRC = ,F7.2,3H FT ,//,12X,7HIX = ,F7.2,9H SL FT SQ ,7X,	RV2 247
8 7HIY = ,F7.2,9H SL FT SQ ,//,12X,7HIZ = ,F7.2,9H SL FT SQ ,	RV2 248
9 6X,8HJXZ = ,F7.2,9H SL FT SQ,///,9X,12HSTART TIME = ,F7.3,	RV2 249
A 4H SFC,15X,11HSTOP TIME = ,F7.3,4H SFC,22X,11HINCREMENT = ,F7.3,	RV2 250

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      B 4H SFC ,//)
      WRITE(L2,620)MACH1,BM1,MACH2,BM1,MACH,BM1,((BODYF(I,J,1),J=1,4)
      1 ,(BODYF(I,J,2),J=2,4),(COEF(I,J),J=2,4),I=1,NALPHA)
      620 FORMAT(/50X,16HAERODYNAMIC DATA 30X,17HINTERPOLATED DATA //
      1 10X,3(12H MACH NO F6.3, 6H BM F6.3,5X)//
      2 9X,5HALPHA 3(35H CL CD CM 1/
      3 /15X,F6.3,5X,3F10.5,5X,3F10.5,5X,3F10.5))
      C
      CONVERT AERC DATA
      DO 630 I=1,NALPHA
      COEF(I,1)=COEF(I,1)/57.2958
      COEF(I,2)=COEF(I,2)*FACTL
      COEF(I,3)=COEF(I,3)*FACTL
      630 COEF(I,4)=COEF(I,4)*FACTM
      WRITE (L8) G,A,BMC,M,IX,IY,IZ,JXZ,DD,I1,I2,I3,I4,I5,I6,NDIM
      1,I7,I8,B,IR,MACH,MACH1,MACH2
      2,BM1,NALPHA,((COEF(I,J),I=1,NALPHA),J=1,4),SIDSLP
      3,R,(TOL(I),I=1,8)
      I3F=0
      ZZMX=0.
      ZZMY=0.
      ZZMZ=0.
      VDUM=OMEGA*R
      ODUM=OMEGA
      RDUM=R
      WRITE (L8) AMUFS,ALAMFS,NMOCK,ITEST
      WRITE (L8) AA,(PRMT(I),I=1,4),I3F
      WRITE (L8) RDUM,VDUM,ODUM,ZZMX,ZZMY,ZZMZ
      640 WRITE (L3) LCON,NXF2,NP,((ALAM(J,I),AMUC(J,I),RHOC(J,I),J=1,NXF2),
      1 I=1,NP)
      IF(I0YN) 660,650,660
      650 WRITE (L8) AMUFS,ALAMFS,NMOCK,ITEST
      660 DO 670 I=1,NM
      AMOM(I)=AMOM(I)/57.2958
      ADDD(I)=ADDD(I)/57.2958
      CLREF(I)=CLREF(I)/5.73
      COSLP(I)=COSLP(I)*10.0
      CMSLP(I)=CMSLP(I)*10.0
      CMO(I) = CMO(I) / 5.73
      ALOL(I) = ALOL(I) / 57.29578
      CDO(I) = CDO(I) / 5.73
      AO(I) = AO(I) * 10.0
      CLAD(I) = CLAD(I) * 10.0
      CMTAD(I) = CMTAD(I) * 10.0
      SAMOM(I)=SAMOM(I)/57.2958
      SADDD(I)=SADDD(I)/57.2958
      SCLREF(I)=SCLREF(I)/5.73
      SCOSLP(I)=SCOSLP(I)*10.0
      SCMSLP(I)=SCMSLP(I)*10.0
      SCMO(I)=SCMO(I)/5.73
      SALOL(I)=SALOL(I)/57.2958

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RV2 251
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1RV2 300

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SCDD(I)=SCDD(I)/5.73	IRV2 301
SAO(I)=SAO(I)*10.0	IRV2 302
SCLAD(I)=SCLAD(I)*10.0	IRV2 303
SCMTAD(I)=SCMTAD(I)*10.0	IRV2 304
RAMOM(I)=RAMOM(I)/57.2958	IRV2 305
RADDD(I)=RADDD(I)/57.2958	IRV2 306
RCLREF(I)=RCLREF(I)/5.73	IRV2 307
RCDSLPI(I)=RCDSLPI(I)*10.0	IRV2 308
RCMSLP(I)=RCMSLP(I)*10.0	IRV2 309
RCMO(I)=RCMO(I)/5.73	IRV2 310
RALOL(I)=RALOL(I)/57.2958	IRV2 311
RCDD(I)=RCDD(I)/5.73	IRV2 312
RAO(I)=RAO(I)*10.0	IRV2 313
RCLAD(I)=RCLAD(I)*10.0	IRV2 314
670 RCMTAD(I)=RCMTAD(I)*10.0	IRV2 315
TORQSV = 0.	RV2 316
ALFAR = 0.0	RV2 317
NTOR = 0	RV2 318
DO 680 I=1,NX	IRV2 319
THX(I) = THX(I)/57.29578	IRV2 320
STHX(I) = SIN(THX(I))	IRV2 321
CTHX(I) = COS(THX(I))	IRV2 322
680 XX(I) = X(I) - E2 * 12.0	IRV2 323
GO TO (690,720), NREF	RV2 324
690 DO 700 I=1,NX	IRV2 325
AS5(I) = CG(I) * 2.722	IRV2 326
AS3(I) = STHX(I) * AS5(I)	IRV2 327
AS4(I) = CTHX(I) * AS5(I)	IRV2 328
700 AS6(I)=AIC(I)*CTHX(I)/CTHX(I)	IRV2 329
AMSI(6) = DINT1(AS3,X,1,NX) /12.0	RV2 330
AMSI(7) = DINT1(AS4,X,1,NX) /12.0	RV2 331
DO 710 I=1,NX	IRV2 332
AS3(I) = AS3(I) * XX(I)	IRV2 333
710 AS4(I) = AS4(I) * XX(I)	IRV2 334
GO TO 740	RV2 335
720 DO 730 I=1,NX	IRV2 336
AIC(I) = AIC(I) & FA(I) * (FA(I) - CG(I) - CG(I)) * EM(I)	IRV2 337
730 CG(I) = CG(I) - FA(I)	IRV2 338
GO TO 690	RV2 339
740 AMSI(6) = DINT1(AS3,X,1,NX) /144.0	RV2 340
AMSI(7) = DINT1(AS4,X,1,NX) /144.0	RV2 341
AMSI(9) = DINT1(AS6,X,1,NX) /144.	RV2 342
FLOATN = NP	RV2 343
NPI = NP & 1	RV2 344
DPSI = 6.283185 / FLOATN	RV2 345
DPSI2 = DPSI /2.0	RV2 346
NV = (NPI * (NPI & 1)) /2	RV2 347
NV0 = (NP * (NP & 1)) /2	RV2 348
DPSI0 = 360.0 / FLOATN	RV2 349
PSTR = 0.0	RV2 350

DO 750 I=1,NP1	IRV2 351
CPSI(I) = CCS(PSIR)	IRV2 352
SPSI(I) = SIN(PSIR)	IRV2 353
750 PSIR = PSIR & DPSI	IRV2 354
PSI(I) = 0.0	RV2 355
DO 760 I=2,NP1	IRV2 356
760 PSI(I) = PSI(I-1) & DPSID	IRV2 357
RINS = R * 12.0	RV2 358
CO = DINT1(C,X,NX1,NX2) / (X(NX2)-X(NX1))	RV2 359
DO 770 I=NX1,NX2	IRV2 360
CC(I) = C(I) / CO	IRV2 361
X(I) = X(I) / RINS	IRV2 362
XX(I) = XX(I) / RINS	IRV2 363
XX1(I) = X(I) - X1	IRV2 364
AX(I) = XX(I) * CC(I)	IRV2 365
BX(I) = C(I) / RINS	IRV2 366
CX(I) = BX(I) * CC(I)	IRV2 367
XA(I) = (FA(I) - C(I)/4.) / C(I)	IRV2 368
DX(I) = CX(I) * XA(I)	IRV2 369
770 FX(I) = CC(I) * XX1(I)	IRV2 370
WRITE (L3) NTR,Q2,P2,CMFGA,ALAMO,AMU,TOROSV,ALFAR	RV2 371
WRITE (L5) NOPT,NOCYCL,(BCINIT(I),I=1,6),NCASE,HEAD,REFM,	RV2 372
1 R,E1,E2,(AMST(I),I=1,9),X1,FLOATN,NP1,NV,NVO,DPSI,DPSI2,NX1,NX2,	RV2 373
C(PSI(I),CPSI(I),SPSI(I),I=1,NP1),CO,(CC(I),XX(I),XX1(I),AX(I),	RV2 374
OBX(I),CX(I),XA(I),DX(I),FX(I),I= NX1,NX2),	RV2 375
2 FCNSP,AKTZ,F21,NX,NREF,	RV2 376
3 (X(I),C(I),FA(I),CG(I),YHX(I),EM(I),AIC(I),I=1,NX),	RV2 377
4 ALT,AKTB,FSPRNG,BSPRNG,ZSPRNG,	RV2 378
5 FDAMP,BDAMP,ZDAMP,NM,STL,STLRF,(AMCH(I),CMO(I),	RV2 379
6 A(I),ALOL(I),CDO(I),CLAD(I),CMTAD(I),CLREF(I),CDSLPI(I),	RV2 380
7 ADD(I),CMSLPI(I),AMOM(I),	RV2 381
8 SCMO(I),SAD(I),SALOL(I),SCDO(I),SCLAD(I),SCMTAD(I),SCLREF(I),	RV2 382
9 SCDSLPI(I),SADOP(I),SCMSLPI(I),SAMOM(I),	RV2 383
A RCMO(I),RAD(I),RALOL(I),RCDO(I),RCLAD(I),RCMTAD(I),RCLREF(I),	RV2 384
B RCDSLPI(I),RADOP(I),RCMSLPI(I),RAMOM(I), I=1,NM),RHO	RV2 385
780 READ (L1,990) NCAL,NOMN,NCSEC	RV2 386
READ (L1,1000) (ALFA(I),I=1,NCAL)	RV2 387
READ (L1,1000) (AMACH(I),I=1,NCMN)	RV2 388
READ (L1,1000) (RADN(I),I=1,NOSFC)	RV2 389
DO 790 I=1,NOSFC	IRV2 390
790 RADN(I) = RADN(I)/R	IRV2 391
READ (L1,1000) (ASTLP(I),I=1,NCPN)	RV2 392
READ (L1,1000) (ASTLN(I),I=1,NCPN)	RV2 393
READ (L1,1000) X0,FCPO,FCHO,BL,XC4,CDOR,GRET	RV2 394
CDOR = CDOR/5.73	RV2 395
X0 = X0/P	RV2 396
DO 800 I=1,NOMA	IRV2 397
ASTLP(I) = ASTLP(I)/57.2958	IRV2 398
800 ASTLN(I) = ASTLN(I)/57.2958	IRV2 399
READ (L1,990) INTAN,NHAFR,NCHAR	RV2 400

IF (LCON) 840, E10, 840	RV2 401
810 READ (L1,1000) REQ,REQ,AMINF,UR,GAMM	RV2 402
READ (L1,1000) (AMDOR(I),I=1,NM)	RV2 403
READ (L1,1000) (XOR(I),I=1,NM)	RV2 404
READ (L1,1000) (DOR(I),I=1,NM)	RV2 405
DO 820 I=2,NM	1RV2 406
IF(AMINF-AMDOR(I)) 830, E30, 820	1RV2 407
820 CONTINUE	1RV2 408
I=NM	RV2 409
830 AMD=(AMINF-AMDCR(I-1))/(AMDCR(I)-AMDOR(I-1))	RV2 410
XREF=(XOR(I-1)&AMD*(XOR(I)-XOR(I-1)))*REQ	RV2 411
DREF=(DCR(I-1)&AMD*(DOR(I)-DOR(I-1)))*REQ	RV2 412
840 IKOM = 1	RV2 413
KCM = 1	RV2 414
DO 850 L=1,3	1RV2 415
OM(L)=0.	1RV2 416
850 CQ(L)=0.	1RV2 417
WRITE (L6) AOS,NC1,NICM,IKOM,KCM,CQTOL,NCHK,(CQ(I),DM(I),I=1,3)	RV2 418
1,ALAMO, IDYN.	RV2 419
DO 860 I=1,NOAL	1RV2 420
860 ALFA(I)=ALFA(I) / 57.2958	1RV2 421
WRITE (L5) IC,NITB, TOA,BOA,ZOA,APHASE,ALFAR,LSS2,HEAD,	RV2 422
1AOS,AIS,BIS,BTCL,ATOLB,NCASE,NAERO,LFAR,	RV2 423
2NOAL,NOMN,NC5FC,ALL,ALH,DELAL,(ALFA(I),I=1,NOAL),X1,X2,	RV2 424
3(AMACH(I),ASTLF(I),ASTLN(I),I=1,NOMN),(RADN(I),I=1,NOSEC),	RV2 425
4 XO,FCPO,FCHO,BL, INTAN,NHARB, NOMAR,CDOR,CRET,	RV2 426
5REQ,REQ,AMINF,TIN,UR,GAMM,NM,XREF,DREF	RV2 427
IF(NAERC) 1020,870,1020	RV2 428
870 DO 880 JJ=1,NOSEC	1RV2 429
DO 880 MM=1,NOMN	2RV2 430
880 READ (L1,1000) (CL(II,MM,JJ),II=1,NOAL)	2RV2 431
DO 890 JJ=1,NOSEC	1RV2 432
DO 890 MM=1,NOMN	2RV2 433
890 READ (L1,1000) (CD(II,MM,JJ),II=1,NOAL)	2RV2 434
DO 900 JJ=1,NOSEC	1RV2 435
DO 900 MM=1,NOMN	2RV2 436
900 READ (L1,1000) (CM(II,MM,JJ),II=1,NOAL)	2RV2 437
DO 910 JJ=1,NOSEC	1RV2 438
DO 910 MM=1,NOMN	2RV2 439
DO 910 II=1,NOAL	3RV2 440
CL(II,MM,JJ)=CL(II,MM,JJ)*0.17452	3RV2 441
CD(II,MM,JJ)=CD(II,MM,JJ)*0.17452	3RV2 442
910 CM(II,MM,JJ)=CM(II,MM,JJ)*0.17452	3RV2 443
IF(XC4) 920,950,920	RV2 444
920 DO 930 I=1,NOAL	1RV2 445
COSAL(I)=COS(ALFA(I)/57.2958)	1RV2 446
930 SINAL(I)=SIN(ALFA(I)/57.2958)	1RV2 447
DO 940 I=1,NOAL	1RV2 448
DO 940 J=1,NOMN	2RV2 449
DO 940 K=1,NOSEC	3RV2 450

940	CM(I,J,K)=CM(I,J,K)-(CL(I,J,K)*COSAL(I)+CD(I,J,K)*SINAL(I))*XC4	3RV2	451
950	DO 960 JJ=1,NOSEC	1RV2	452
	DO 960 MM=1,NCMN	2RV2	453
960	WRITE(L5) (CL(I,MM,JJ),II=1,NOAL)	2RV2	454
	DO 970 JJ=1,NOSEC	1RV2	455
	DO 970 MM=1,NCMN	2RV2	456
970	WRITE(L5) (CD(I,MM,JJ),II=1,NOAL)	2RV2	457
	DO 980 JJ=1,NOSEC	1RV2	458
	DO 980 MM=1,NCMN	2RV2	459
980	WRITE(L5) (CM(I,MM,JJ),II=1,NOAL)	2RV2	460
990	FORMAT(B10)	RV2	461
1000	FORMAT(8F10.4)	RV2	462
1010	FORMAT(3F10.4,I10)	RV2	463
1020	RETURN	RV2	464
	END	RV2	465

```
C      SUBROUTINE AT62(ALT,ANS)
C      CAUTION- IF USING WIND TUNNEL DATA MAKE SURE THIS SUBROUTINE
C      IS COMPATABLE WITH DATA.
C      DIMENSION ANS(4)
C      ANS(1)=.0000399
      ANS(2)=C.0
      ANS(3)=85.0
      ANS(4)=607.91
      RETURN
      END
```

```
AT6  1
AT6  2
AT6  3
AT6  4
AT6  5
AT6  6
AT6  7
AT6  8
AT6  9
AT6 10
AT6 11
AT6 12
AT6 13
```

SUBROUTINE AT62(ZFT,ANS)	AT6	1
REAL PH,HZ,A,B,WA,WB,D1,D2,D3,PZ	AT6	2
DIMENSION ANS(4)	AT6	3
DIMENSION HT(8),TH(8),THD(8),PH(8)	AT6	4
DATA HT/0.,11.,20.,32.,47.,52.,61.,79./	AT6	5
DATA TH/288.15,216.65,216.65,228.65,270.65,270.65,252.65,180.65/	AT6	6
DATA THD/-6.5,0.,1.,2.8,0.,-2.,-4.,0./	AT6	7
DATA PH/101325.,22632.0638,5474.88855,868.018647,110.906298,	AT6	8
P59.0009367,18.2100724,1.03771164/	AT6	9
DIMENSION TZ(13),TZ(13),TZD(13),HZ(13),A(13),B(13)	AT6	10
DATA TZ/90.,100.,110.,120.,150.,160.,170.,190.,230.,300.,400.,	AT6	11
Z500.,600./	AT6	12
DATA TZ/180.65,210.65,260.65,360.65,960.65,1110.65,1210.65,	AT6	13
T 1350.65,1550.65,1830.65,2160.65,2420.65,2590.65/	AT6	14
DATA TZD/3.,5.,10.,20.,15.,10.,7.,5.,4.,3.3,2.6,1.7,1.1/	AT6	15
DATA HZ/88.7433565,98.4509829,108.128578,117.776280,146.541401,	AT6	16
H156.070501,165.571187,184.484657,221.966870,286.476269,376.312415,	AT6	17
K463.526097,548.230014/	AT6	18
DATA A/.99999916,.99999897,.99999877,.99999832,.99999776,.99999746	AT6	19
A,.99999698,.99999592,.99999355,.99999878,.99998131,.99997196,	AT6	20
C.99996075/	AT6	21
DATA B/.00015734766,.00015734953,.00015735140,.00015735513,	AT6	22
B.00015735887,.00015736074,.00015736355,.00015736915,.00015737943,	AT6	23
D.00015739532,.00015741401,.00015743271,.00015745140/	AT6	24
DIMENSION WA(13),WB(13),WC(13)	AT6	25
DATA WA/21.998808,15.798995,31.044527,40.387675,29.538575,	AT6	26
W32.268571,27.789444,32.166670,30.241635,34.561172,	AT6	27
W36.099504,38.195672,18.258073/	AT6	28
DATA WB/.15479092,.27878720,.0015957013,-.15412343,-.0094687678	AT6	29
W,-.043598715,.0091016009,-.036974463,-.020235026,	AT6	30
W-.049031942,-.056723605,-.065108273,.0013503901/	AT6	31
DATA WC/-.85994958E-3,-.14799309E-2,-.21996960E-3,.42886012E-3,	AT6	32
W-.53322091E-4,.53333994E-4,-.10166693E-3,.19585867E-4,	AT6	33
W-.16804213E-4,.31190648E-4,.40805227E-4,.49189895E-4,	AT6	34
W-.61923241E-5/	AT6	35
DIMENSION D1(13),D2(13),D3(13)	AT6	36
DATA D1/.0017834765,.001065422,.00053055610,.00026454351,	AT6	37
D.00035360997,.00053348782,.00076036496,.0010889831,.0013783559,	AT6	38
D.0016975137,.0022189663,.0037023997,.0067578185/	AT6	39
DATA D2/-11.281753,-6.7098914,-3.3278396,-1.6546388,-2.2171667,	AT6	40
D-3.3643151,-4.8850055,-7.0083025,-8.9810162,-11.235530,-15.122423,	AT6	41
D-27.520411,-59.311259/	AT6	42
DATA D3/.016920782,.024325051,.039545102,.057409044,.016199137,	AT6	43
D.0093014845,.0059339235,.0037645169,.0026065966,.0018120459,	AT6	44
D.0011923023,.00064736059,.00033627561/	AT6	45
DIMENSION PZ(13)	AT6	46
DATA PZ/.16438012,.030075034,.0073545270,.0025216927,	AT6	47
P.00050617890,.00036943532,.00027926462,.00016852498,.69605367E-4,	AT6	48
P.18838777E-4,.40304321E-5,.10956964E-5,.34502614E-6/	AT6	49
ALT=ZFT*0.3048	AT6	50
Z=ALT/1000.	AT6	51
IF(Z.LT.-5.)Z=-5.	AT6	52
IF(7.GT.700.)Z=700.	AT6	53
IF(Z.GT.90.)GO TO 90	AT6	54
DEN=1.060.C0015733831E0*Z	AT6	55
H=Z/DEN	AT6	56
GMW=28.9644	AT6	57
IF(H.GE.47.)GO TO 47	AT6	58
IF(H.GE.20.)GO TO 20	AT6	59

J=1	AT6 60
IF(H.GE.11.)J=2	AT6 61
GO TO 21	AT6 62
20 J=3	AT6 63
IF(H.GE.32.)J=4	AT6 64
GO TO 21	AT6 65
47 IF(H.GE.61.)GO TO 61	AT6 66
J=5	AT6 67
IF(H.GE.52.)J=6	AT6 68
GO TO 21	AT6 69
61 J=7	AT6 70
IF(H.GE.79.)J=8	AT6 71
21 TM=TH(J)&T+D(J)*(H-HT(J))	AT6 72
IF(THD(J).EQ.0.)GO TO 5	AT6 73
PLOG=-34.163195E0*ALOG(TM/TH(J))/THD(J)	AT6 74
GO TO 2	AT6 75
5 PLOG=-34.163195E0*(H-HT(J))/TM	AT6 76
2 PB=PH(J)	AT6 77
GO TO 100	AT6 78
90 IF(Z.LT.170.)GO TO 11	AT6 79
IF(Z.LT.300.)GO TO 12	AT6 80
IF(Z.LT.500.)GO TO 13	AT6 81
J=13	AT6 82
IF(Z.LT.600.)J=12	AT6 83
GO TO 10	AT6 84
13 J=11	AT6 85
IF(Z.LT.400.)J=10	AT6 86
GO TO 10	AT6 87
12 J=9	AT6 88
IF(Z.LT.230.)J=8	AT6 89
IF(Z.LT.190.)J=7	AT6 90
GO TO 10	AT6 91
11 IF(Z.LT.120.)GO TO 14	AT6 92
J=6	AT6 92
IF(Z.LT.160.)J=5	AT6 93
IF(Z.LT.150.)J=4	AT6 94
GO TO 10	AT6 95
14 J=3	AT6 96
IF(Z.LT.110.)J=2	AT6 97
IF(Z.LT.100.)J=1	AT6 98
10 GMW=WA(J)&Z*(WB(J)&Z*WC(J))	AT6 99
TM=TZ(J)&T+ZD(J)*(Z-ZT(J))	AT6 100
DEN=A(J)&Z*B(J)	AT6 101
H=Z/DEN	AT6 102
DELTAH=H-HZ(J)	AT6 103
PLOG=D1(J)*DELTAH&D2(J)*ALOG(1.0&D3(J)*DELTAH)	AT6 104
PB=PZ(J)	AT6 105
100 P=PB*EXP(PLOG)	AT6 106
ANS(1)=6.75944794E-6*P/TM	AT6 107
ANS(2)=P*0.020285434E0	AT6 108
ANS(3)=GMW*TM/28.9644	AT6 109
ANS(4)=894.50046E0	AT6 110
ARG1=4325.73899E0*TM	AT6 111
IF(ZFT.LT.300000.)ANS(4)=SQRT(ARG1)	AT6 112
RETURN	AT6 113
END	AT6 114

	FUNCTION DINT1 (A,X,N1,N2)	DN1	1
C		DN1	2
C	DINT = TRAP. INT. OF A WRT X	DN1	3
C	A(I),X(I) I=N1,N2 N2 MAX = 16	DN1	4
		DN1	5
	DIMENSION A(16),X(16)	DN1	6
	DINT1= (A(N1)*(X(N1&1)-X(N1))+A(N2)*(X(N2)-X(N2-1)))/2.	DN1	7
	M1=N1&1	DN1	8
	M2=N2-1	DN1	9
	DO 100 I=M1,M2	DN1	10
100	DINT1= DINT1&A(I)*(X(I&1)-X(I-1))/2.0	DN1	11
	RETURN	DN1	12
	END	DN1	13

	SUBROUTINE REV 03	RV3	1
C		RV3	2
C		RV3	3
	COMMON L1, L2, L3, L4, L5, L6, L7, L8, NCHK	RV3	4
C		RV3	5
	COMMON X(16),NX1,NX2,CCPN,CALOL,CCDO,CAO,CCLAD,CCMTAD,CCLRFF, ICDCLP,CCMSLP,CADOD,CAPCM,CLCON,CDCON,CMCON,THX(16),FACTOR	RV3	6
	DIMENSION HEAD(17),BCINIT(6),AMSI(10),C(16),FA(16),	RV3	7
	1 CG(16),EM(16),AIC(16),STHX(16),CTHX(16),AS2(16),	RV3	8
	2 XX(16),AS3(16),AS4(16),AS5(16),AS6(16),AMCH(10),CO(3),OM(3),	RV3	9
	3 AO(10),ALOL(10),CDO(10),CMO(10),CMTAD(10),CLAD(10),CPSI(25),	RV3	10
	4 SPSI(25),PSI(25),CC(16),XX1(16),AX(16),RX(16),CX(16),XA(16),	RV3	11
	5 DX(16),EX(16),FX(16),T1FX(16),T2FX(16),T3FX(16),T4FX(16),	RV3	12
	6 T5FX(16),T6FX(16),T1ZX(16),T2ZX(16),T3ZX(16),T4ZX(16),T5ZX(16),	RV3	13
	7 T6ZX(16),T1BX(16),T2BX(16),T3BX(16),T4BX(16),T5BX(16),T6BX(16)	RV3	14
C		RV3	15
	DIMENSION CT1(25),CT2(25),CT3(25),CT7(25),CT8(25),CT9(25);	RV3	16
	1 CT10(25),CT11(25),CT12(25),TOT(25),CZ1(25),CZ2(25),	RV3	17
	2 CZ3(25),CZ7(25),CZ8(25),CZ9(25),CZ10(25),CZ11(25),CZ12(25),	RV3	18
	3 TOZ(25),CB1(25),CB2(25),CB3(25),CB7(25),CB8(25),	RV3	19
	4 CB9(25),CB10(25),CB11(25),CB12(25),TOB(25),T8FX(16),	RV3	20
	5 T8BX(16),T8ZX(16),T9ZX(16),T10ZX(16),T11ZX(16),T12ZX(16),A1(325),	RV3	21
	6 A2(325),A3(325),A4(325),A5(325),A6(325),A7(325),	RV3	22
	7 A8(325),A9(325),A10(325),A11(325),A12(325),CLREF(10),	RV3	23
	8 CDSL(10),CMSLP(10),ACCD(10),AMOM(10)	RV3	24
C		RV3	25
	DIMENSION SCMO(10),SALOL(10),SCDO(10),SCLAD(10),SCMTAD(10),	RV3	26
	1 SCLRFF(10),SCDSL(10),SCMSLP(10),SAO(10),SADOD(10),SAMOM(10)	RV3	27
	DIMENSION RCMO(10),RALOL(10),RCDO(10),RCLAD(10),RCMTAD(10)	RV3	28
	1, RCLREF(10),RCDSL(10),RCMSLP(10),RAO(10),RADOD(10),RAMOM(10)	RV3	29
	DIMENSION ALAM(12,25),AMUC(12,25),RHOC(12,25),ALRO(12,25),	RV3	30
	1 AMRO(12,25),ALMRO(12,25),T7FXD(16),T7BXD(16),	RV3	31
	2 AX1(16),CX1(16),DX1(16),FX1(16)	RV3	32
C		RV3	33
	REWIND L3	RV3	34
	REWIND L5	RV3	35
	REWIND L6	RV3	36
	READ(L3) LCCN,NXF2,NP,((ALAM(J,I),AMUC(J,I),RHOC(J,I),J=1,NXF2),	RV3	37
	1 I=1,NP)	RV3	38
	READ(L2) NTOR,Q2,P2,OMEGA,ALAMO,AMU,TORQSV	RV3	39
	READ(L5) NOPT,NOCYCL,(BCINIT(I),I=1,6),NCASE,HEAD,REFN,	RV3	40
	1 R,F1,E2,(AMSI(I),I=1,9),X1,FLCATN,NP1,NV,NV0,DPST,DPST2,NX1,NX2,	RV3	41
	C(PST(I),CPSI(I),SPSI(I),I=1,NP1),CO,(CC(I),XX(I),XX1(I),AX(I),	RV3	42
	DBX(I),CX(I),XA(I),DX(I),FX(I),I=NX1,NX2),	RV3	43
	2 FCNSP,AKTZ,F21,NX,NREF,	RV3	44
	3 (X(I),C(I),FA(I),CG(I),THX(I),EM(I),AIC(I),I=1,NX),	RV3	45
	4 ALT,AKTR,FSPRNG,ASPRNG,ZSPRNG,	RV3	46
	5 FDAMP,BDAMP,ZCAMP,NM,STL,STLRF,(AMCH(I),CMO(I),	RV3	47
	6 A1(I),ALOL(I),CDO(I),CLAD(I),CMTAD(I),CLREF(I),CDSL(10),	RV3	48
		RV3	49
		RV3	50

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7  ADOD(I),CMSLP(I),AMOM(I),                RV3  51
8  SCMO(I),SAL(I),SALOL(I),SCDO(I),SCLAD(I),SCLTAD(I),SCLREF(I),  RV3  52
9  SCOSLP(I),SADOD(I),SCMSLP(I),SAMOM(I),    RV3  53
A  RCMO(I),RAO(I),RALOL(I),RCDO(I),RCLAD(I),RCMTAD(I),RCLREF(I),  RV3  54
B  RCOSLP(I),RADOD(I),RCMSLP(I),RAMOM(I), I=1,NM),RHO          RV3  55
P2 = -P2                                       RV3  56
READ (L6)                                     RV3  57
100 OMEGI = OMEGA * AMSI(5)                   RV3  58
C                                               RV3  59
GAMMA2 = CO * R**4 * 0.001 * 0.56775 / AMSI(5)  RV3  60
FDAMP = FDAMP / OMEGI                        RV3  61
ZDAMP = ZDAMP / OMEGI                        RV3  62
BDAMP = BDAMP / OMEGI                        RV3  63
FSPRNG = FSPRNG / OMEGI / OMEGA             RV3  64
ZSPRNG = ZSPRNG / OMEGI / OMEGA             RV3  65
BSPRNG = BSPRNG / OMEGI / OMEGA             RV3  66
RFFM=REFM/OMEGA/R                            RV3  67
FCNSP = FCNSP / OMEGI / OMEGA                RV3  68
CT1C =AMSI(8)/AMSI(5)                        RV3  69
CT9C = AMSI(3)*E1/AMSI(5)                    RV3  70
CT7C = (E21*AMSI(3)&AMSI(6))/AMSI(5)         RV3  71
CT10C= -AMSI(7)/AMSI(5)                     RV3  72
CT3C = AMSI(9)/AMSI(5)&FSPRNG&FCNSP          RV3  73
CT12C = (-AMSI(7)-E2*AMSI(4))/AMSI(5)--AKTB*FCNSP  RV3  74
C27C = (E21*E21*AMSI(1)&E21*AMSI(2)&AMSI(9))/AMSI(5)&1.0  RV3  75
C79C = (E21*AMSI(1)&AMSI(2))*E1/AMSI(5)&ZSPRNG  RV3  76
CZ11C= CT7C*2.C                             RV3  77
CZ16C = E1*AMSI(4)/AMSI(5)                   RV3  78
CB10C = 1.0                                  RV3  79
CB12C = E2*AMSI(2)/AMSI(5)&1.0&BSPRNG&FCNSP*AKTB*AKTB  RV3  80
CB16C = -(AMSI(3)*E2-AMSI(6))/AMSI(5)        RV3  81
DO 110 J = NX1,NX2                            1RV3  82
RHOC(J,NP1) = RHOC(J,1)                      1RV3  83
AMUC(J,NP1) = AMUC(J,1)                      1RV3  84
110 ALAM(J,NP1) = ALAM(J,1)                  1RV3  85
C                                               RV3  86
DO 230 I=1,NP1                                1RV3  87
P2S=P2*SPSI(I)                                1RV3  88
P2C=P2*CPSI(I)                                1RV3  89
Q2S=Q2*SPSI(I)                                1RV3  90
Q2C=Q2*CPSI(I)                                1RV3  91
ARATE=(Q2C&P2S)*.5                            1RV3  92
DO 220 J=NX1,NX2                              2RV3  93
UTO = X(J) & AMUC(J,I) * SPSI(I)             2RV3  94
UTO2 = LTO * UTO                              2RV3  95
U2 = ALAM(J,I) & X(J) * ARATE                 2RV3  96
U2SQ = U2 * U2                                2RV3  97
U1 = UTO2 & U2SQ                              2RV3  98
U = SQRT(U1)                                  2RV3  99
U4 = UTO**3/U2                                2RV3 100

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UCHK = U250 / LT02	2RV3 101
IF (UCHK - 1.0) 120,120,130	2RV3 102
120 ASIGN = 1.0	2RV3 103
AZN = 0.0	2RV3 104
AZM = 1.0	2RV3 105
GO TO 140	2RV3 106
130 ASIGN = -1.0	2RV3 107
AZN = 1.0	2RV3 108
AZM = 0.0	2RV3 109
140 AMNO = ABS(U/REFH)	2RV3 110
DO 150 K=2,NM	3RV3 111
IF(AMNO-AMCH(K)) 160,16C,150	3RV3 112
150 CONTINUE	3RV3 113
K=NM	2RV3 114
160 FACTOR = (AMNO-AMCH(K-1)) / (AMCH(K)-AMCH(K-1))	2RV3 115
IF(UTO-STL) 18C,170,170	2RV3 116
170 CALL CALC(CMC,ALOL,CDO,AO,CLAD,CMTAD,CLREF,COSLP,	2RV3 117
ICMSLP,AOD,AMOP,K,J)	2RV3 118
GO TO 210	2RV3 119
180 IF(UTO-STLRF) 200,200,190	2RV3 120
190 CALL CALC(SCHC,SALOL,SCDO,SAO,SCLAD,SCMTAD,SCLREF,	2RV3 121
ISCOSLP,SCMSLP,SADOD,SAMOM,K,J)	2RV3 122
GO TO 210	2RV3 123
200 CALL CALC(RCMO,RALOL,RCDO,RAO,RCLAD,RCMTAD,RCLREF,	2RV3 124
IRCOSLP,RCMSLP,RADOD,RAMOM,K,J)	2RV3 125
210 AX1(J) = AX(J) * RHOC(J,I)	2RV3 126
CX1(J) = CX(J) * RHOC(J,I)	2RV3 127
DX1(J) = DX(J) * RHOC(J,I)	2RV3 128
FX1(J) = FX(J) * RHOC(J,I)	2RV3 129
F1 = CAO * UTO * ASIGN	2RV3 130
F2 = CCOSLP * UTO * ASIGN	2RV3 131
F3 = AMLC(J,I)	2RV3 132
F6 = (1.5708 * U1 - U4) * AZN	2RV3 133
F7 = 2.0 * CLCON * U2 & F1	2RV3 134
F11 = U4 * AZN	2RV3 135
F12 = U2 ** 3 / UTO * AZM * .66667	2RV3 136
F13 = 2.0 * CLCON * UTO & ASIGN * CAO * U2	2RV3 137
F17 = F6 & F12	2RV3 138
T1BX(J) = AX1(J) * (U1 * CLCON & U2 * F1 & CAO * F17)	2RV3 139
T2BX(J) = -AX1(J) * (U1 * (CDOCON - CAO) & F2 * U2 & CCOSLP * F17)	2RV3 140
T3BX(J) = -AX1(J) * F3 * F7	2RV3 141
T4BX(J) = AX1(J) * F3 * F13	2RV3 142
T5BX(J) = -AX1(J) * XX(J) * F7	2RV3 143
T6BX(J) = AX1(J) * XX1(J) * F13	2RV3 144
T7BXD(J) = AX1(J) * BX(J) * CCLAD * UTO	2RV3 145
F4 = DX1(J) * CLCON & CX1(J) * CMCN	2RV3 146
F5 = DX1(J) * CAO & CX1(J) * CCMSLP	2RV3 147
F8 = UTO * F5	2RV3 148
F9 = UYC * F4	2RV3 149
F14 = 2.0 * U2 * F4 & ASIGN * F8	2RV3 150

F15 = 2.0 * F9 & F5 * ASIGN * U2	2RV3 151
T1FX(J) = U1 * F4 & F5 * (ASIGN * U2 * UTO & F17)	2RV3 152
T2FX(J) = U1 * F5	2RV3 153
T3FX(J) = -F3 * F14	2RV3 154
T4FX(J) = F3 * F15	2RV3 155
T5FX(J) = -XX(J) * F14	2RV3 156
T6FX(J) = XX1(J) * F15	2RV3 157
T7FXD(J) = BX(J) * CX1(J) * CCMTAD * U	2RV3 158
F16 = 2.0 * CCON * UTO & CCDSL * U2 * ASIGN	2RV3 159
F18 = 2.0 * U2 * CCON & CCDSL * UTO * ASIGN	2RV3 160
T1ZX(J) = -FX1(J) * ( CCON * U1 & U2 * F2 & CCDSL * F17)	2RV3 161
T2ZX(J) = -FX1(J) * (U1 * (CLCON & CCDSL) & U2 * F1 & CAO * F17)	2RV3 162
T3ZX(J) = FX1(J) * F3 * F18	2RV3 163
T4ZX(J) = - FX1(J) * F3 * F16	2RV3 164
T5ZX(J) = FX1(J) * XX(J) * F18	2RV3 165
T6ZX(J) = -FX1(J) * XX1(J) * F16	2RV3 166
T7ZXD(J) = BX(J) * FX1(J) * CCLAD * U2	2RV3 167
220 CONTINUE	2RV3 168
CB1(I)=CT10C	1RV3 169
CB2 (I) = -GAMMA2 * DINT(T7RXD)	1RV3 170
CB3 (I) = CT12C - GAMMA2 *DINT(T2BX)	1RV3 171
CB7(I)=0.	1RV3 172
CB8 (I) = -CZ11C - GAMMA2*DINT(T6BX)	1RV3 173
CB9 (I) = - GAMMA2 * DINT(T4BX) * CPSI(I)	1RV3 174
CB10(I) = CB10C	1RV3 175
CB11(I) = RDAMP - GAMMA2 * DINT(T5BX)	1RV3 176
CB12(I) = CB12C - GAMMA2 * DINT(T3BX) * CPSI(I)	1RV3 177
T0B(I) = CB16C & GAMMA2 * DINT(T1BX) & (1.0 & AMSI(1) * F2 /	1RV3 178
1 AMSI(5)) * (P2C - C2S)	1RV3 179
CT1(I) = CT1C	1RV3 180
CT2 (I) = FDAMP - GAMMA2 * DINT(T7FXD)	1RV3 181
CT3 (I) = CT3C - GAMMA2 * DINT(T2FX)	1RV3 182
CT7(I) = CT7C	1RV3 183
CT8 (I) = - GAMMA2 * DINT(T6FX)	1RV3 184
CT9 (I) = CT9C - GAMMA2 * CPSI(I) * DINT(T4FX)	1RV3 185
CT10(I) = CT10C	1RV3 186
CT11(I) = -GAMMA2 * DINT(T5FX)	1RV3 187
CT12(I) = -GAMMA2 * CPSI(I) * DINT(T3FX) & CT12C	1RV3 188
T0T(I) = GAMMA2 * DINT(T1FX) - (AMSI(7) & E2 * AMSI(4)) / AMSI(5)	1RV3 189
1 * (Q2S - P2C) - AMSI(9) / AMSI(5) * (Q2C & P2S)	1RV3 190
CZ1(I)=CT7(I)	1RV3 191
CZ2 (I) = -GAMMA2 * DINT(T7ZXD)	1RV3 192
CZ3 (I) = CT9C - FCNSP * AKTZ - GAMMA2 * DINT(T2ZX)	1RV3 193
CZ7(I) = CZ7C	1RV3 194
CZ8 (I) = ZDAMP - GAMMA2 * DINT(T6ZX)	1RV3 195
CZ9 (I) = CZ9C - GAMMA2 * DINT(T4ZX) * CPSI(I) & FCNSP * AKTZ	1RV3 196
CZ10(I)=0.	1RV3 197
CZ11(I) = CZ11C - GAMMA2 * DINT(T5ZX)	1RV3 198
CZ12(I) = - GAMMA2 * DINT(T3ZX) * CPSI(I) & FCNSP * AKTZ * AKTB	1RV3 199
T0Z(I) = CZ16C & GAMMA2 * DINT(T1ZX)	1RV3 200

	230 CONTINUE	1RV3 201
C		RV3 202
C	CALCULATE RESPONSE MATRICES .	RV3 203
C		RV3 204
	CALL SIGCOM(A1,CT1,CT2,CT3,CPST2,NP1)	RV3 205
	CALL SIGCOM(A2,CT7,CT8,CT9,CPST2,NP1)	RV3 206
	CALL SIGCOM(A3,CZ1,CZ2,CZ3,CPST2,NP1)	PV3 207
	CALL SIGCOM(A4,CZ7,CZ8,CZ9,DPST2,NP1)	RV3 208
	CALL SIGCOM(A6,CT10,CT11,CT12,DPST2,NP1)	RV3 209
	CALL SIGCOM(A7,CZ10,CZ11,CZ12,DPST2,NP1)	RV3 210
	CALL SIGCOM(A8,CB10,CB11,CB12,DPST2,NP1)	RV3 211
	CALL SIGCOM(A9,CB1,CB2,CB3,DPST2,NP1)	RV3 212
	CALL SIGCOM(A10,CB7,CB8,CB9,DPST2,NP1)	RV3 213
	AMSX=AMSI(5)	RV3 214
	DO 240 I=1,9	1RV3 215
240	AMSI(I) = AMSI(I)/AMSX	1RV3 216
	AMSI(5)=AMSX	RV3 217
	DO 250 I=NX1,NX2	1RV3 218
	FA(I) = FA(I)/CO	1RV3 219
250	EM(I) = EM(I) * 32.?	1RV3 220
	CO = CO /12.	RV3 221
	WRITE (L6) NP,NX,NX1,NX2,FLCATN,DPST2,NCASE,HEAD,(PSI(I),I=1,NP),	RV3 222
	1 AKTB,FCNSP,(TCB(I),TOT(I),TOZ(I),	RV3 223
	2SPSI(I),CPST(I),I=1,NP),FSPRNG,AKTZ,ZSPRNG,RSPRNG,	RV3 224
	3 EI,E2,R,FDAMP,RDAMP,ZDAMP,CO,RHC,GAMMA2,PEFM,(X(I),	RV3 225
	4XX1(I),XX(I),CC(I),THX(I),EM(I),XA(I),FA(I), I=NX1,NX2),	RV3 226
	1(AMSI(I),I=1,9)	RV3 227
	WRITE (L6) (CT1(I),CT2(I),CT3(I),CT7(I),CT8(I),CT9(I),CT10(I),	RV3 228
	1 CT11(I),CT12(I),CZ1(I),CZ2(I),CZ3(I),CZ7(I),CZ8(I),CZ9(I),	RV3 229
	2 CZ10(I),CZ11(I),CZ12(I),CB1(I),CB2(I),CB3(I),CB7(I),CB8(I),	RV3 230
	3 CB9(I),CB10(I),CB11(I),CB12(I),I=1,NP),NOPT,NOCYCL,	RV3 231
	4(ACINIT(I),I=1,6)	RV3 232
	END FILE L6	PV3 233
	REWIND L6	RV3 234
	CALL TINV(A5,A1,NP1)	RV3 235
	CALL TXT(A1,A5,A2,0,1,NP1)	PV3 236
	CALL TXT(A4,A3,A1,1,0,NP1)	RV3 237
	CALL TINV(A2,A4,NP1)	RV3 238
	CALL TXT(A4,A3,A5,0,1,NP1)	RV3 239
	CALL TXT(A7,A2,A4,0,0,NP1)	RV3 240
	CALL TXT(A4,A1,A2,0,0,NP1)	RV3 241
	CALL TXT(A5,A1,A3,1,0,NP1)	RV3 242
		RV3 243
	2 X 2 COMPLETED	PV3 244
		RV3 245
	CALL TXT(A11,A5,A6,0,1,NP1)	RV3 246
	CALL TXT(A11,A4,A7,1,1,NP1)	RV3 247
	CALL TXT(A12,A3,A6,0,1,NP1)	RV3 248
	CALL TXT(A12,A7,A7,1,1,NP1)	RV3 249
	CALL TXT(A8,A5,A11,1,0,NP1)	RV3 250
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C		
C		

CALL TXT(A8,A10,A12,1,0,NP1)  
CALL TINV(A1,A8,NP1)  
CALL TXT(A6,A9,A4,0,0,NF1)  
CALL TXT(A6,A10,A2,1,0,NP1)  
CALL TXT(A7,A9,A5,0,0,NP1)  
CALL TXT(A7,A10,A3,1,0,NP1)  
CALL TXT(A8,A1,A6,0,1,NF1)  
CALL TXT(A9,A1,A7,0,1,NF1)  
CALL TXT(A6,A12,A1,0,0,NP1)  
CALL TXT(A7,A11,A1,0,0,NP1)  
CALL TXT(A2,A12,A8,1,0,NP1)  
CALL TXT(A3,A12,A9,1,0,NP1)  
CALL TXT(A4,A11,A8,1,0,NP1)  
CALL TXT(A5,A11,A9,1,0,NP1)

3 X 3 COMPLETED

SORT RESULTS TO TAPE L3

REWIND L3  
READ (L3)  
READ (L3)  
WRITE (L3) A5  
WRITE (L3) A4  
WRITE (L3) A3  
WRITE (L3) A2  
WRITE (L3) A7  
WRITE (L3) A6  
WRITE (L3) A1  
WRITE (L3) A9  
WRITE (L3) A8

RETURN  
END

RV3 251  
RV3 252  
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	SUBROUTINE SIGCCM(A,B,C,D,H2,N)	SIG	1
		SIG	2
	CALCULATES TRIANGULAR MATRIX A (STORED ONE DIMENSIONALLY)	SIG	3
	B,C,D ARE DIAGONALS (STORED ONE DIMENSIONALLY)	SIG	4
	H2 IS CONSTANT HALF INTERVAL        N IS NOM. ORDER	SIG	5
	N = 4 TO 25	SIG	6
	A=B&C*SIGMA&C*SIGMA SQUARED	SIG	7
		SIG	8
	DIMENSION A(325),B(25),C(25),D(25)	SIG	9
	A(1)=B(1)	SIG	10
	A(2)=(C(2)&D(2)*H2)*H2	SIG	11
	A(3)=A(2)&B(2)	SIG	12
	DH1=H2&H2	SIG	13
	AH1=DH1&H2	SIG	14
	DH2=DH1&DH1	SIG	15
	AH2=DH2	SIG	16
	A(4)=(D(3)*AH1&C(3))*H2	SIG	17
	A(5)=D(3)*AH2*H2&C(3)*DH1	SIG	18
	A(6)=(C(3)&D(3)*H2)*H2&B(3)	SIG	19
	IA=6	SIG	20
	DO 110 I=4,N	1SIG	21
	DI=D(I)*H2	1SIG	22
	AH1=AH1&DI	1SIG	23
	AH2=AH2&DI	1SIG	24
	DD=DI*DI	1SIG	25
	IA=IA&2	1SIG	26
	A(IA-1)=C(I)*H2&DI*AH1	1SIG	27
	A(IA)=C(I)*DH1&DI*AH2	1SIG	28
	J1=I-1	1SIG	29
	DO 100 J=3,J1	2SIG	30
	IA=IA&1	2SIG	31
100	A(IA)=A(IA-1)-DD	2SIG	32
	IA=IA&1	1SIG	33
110	A(IA)=B(I)&(C(I)&D(I))*H2	1SIG	34
	RETURN	SIG	35
	END	SIG	36

	FUNCTION DINT (A)	DNT	1
C		DNT	2
C	DINT = TRAP. INT. CF A WRT X	DNT	3
C	A(I),X(I) I=N1,N2 N2 MAX = 16	DNT	4
C		DNT	5
	DIMENSION A(16),X(16)	DNT	6
	COMMON L1, L2, L3, L4, L5, L6, L7, L8, NCHK	DNT	7
	COMMON X,N1,N2	DNT	8
	DINT = (A(N1)* (X(N1&1)-X(N1))EA(N2) *(X(N2)-	DNT	9
	1 X(N2-1)))/2.	DNT	10
	M1=N1&1	DNT	11
	M2=N2-1	DNT	12
	DO 100 I=M1,M2	DNT	13
100	DINT = DINTEA(I)*(X(I&1)-X(I-1))/2.0	DNT	14
	RETURN	DNT	15
	END	DNT	16

C C C C	SUBROUTINE TINV(A,B,N) CALCULATES THE INVERSE OF B AND STORES IN A N IS ORDER N MAX = 25 N IN COMMON A,B ARE LOWER TRIANGLES STORED ONE DIMENSIONALLY  DIMENSION A(325),B(325) IA=1 A(1)=1.0/B(1) DO 120 I=2,N IKO=1 I1=I-1 DO 110 J=1,I1 IR=IA IA=IA&1 IKC=IKO&J-1 IK=IKO A(IA)=C.0 DO 100 K=J,I1 IR=IR&1 IK=IK&K-1 A(IA)=A(IA)&B(IR)*A(IK) 100 A(IA)=-A(IA)/B(IR&1) IA=IA&1 120 A(IA)=1.0/B(IR&1) RETURN END	TIN 1 TIN 2 TIN 3 TIN 4 TIN 5 TIN 6 TIN 7 TIN 8 1TIN 9 1TIN 10 1TIN 11 2TIN 12 2TIN 13 2TIN 14 2TIN 15 2TIN 16 2TIN 17 3TIN 18 3TIN 19 3TIN 20 3TIN 21 2TIN 22 1TIN 23 1TIN 24 TIN 25 TIN 26
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C C C C C	<pre> SUBROUTINE TXT(A,B,C,N1,N2,N)       TXT(A,B,C,N1,N2)       A=(-)B*C(A)      (-) IF N2 .NE. 0                       (&amp;A) IF N1 .NE. 0       A,B,C ARE LOWER TRIANGULAR MATRICES STORES AS VECTORS       N IS ACMINAL CRDR , N MAX = 25 ,N STORED IN COMMON DIMENSION A(325),B(325),C(325)       IA=0       DO 140 I=1,N       ICO=0           DO 140 J=1,I           IB=IA           IA=IA&amp;I           IF (N1) 110,100,11C 100      A(IA)=0.0 110      ICC=ICC&amp;J           IC=ICC           DO 140 K=J,I           IB=IB&amp;I           IF (N2) 130,120,130 120      A(IA)=A(IA)&amp;B(IB)*C(IC)           GO TO 140 130      A(IA)=A(IA)-B(IB)*C(IC) 140  IC=IC&amp;K       RETURN       END </pre>	<pre> TXT  1 TXT  2 TXT  3 TXT  4 TXT  5 TXT  6 TXT  7 TXT  8 TXT  9 1TXT 10 1TXT 11 2TXT 12 2TXT 13 2TXT 14 2TXT 15 2TXT 16 2TXT 17 2TXT 18 3TXT 19 3TXT 20 3TXT 21 3TXT 22 3TXT 23 3TXT 24 3TXT 25 TXT  26 TXT  27 </pre>
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	SUBROUTINE CALC (ACMO, AALOL, ACDO, AAO, ACLAD, ACMTAD, ACLREF, ACDSLP,	CAL	1
	1ACMSLP, AADOD, AAMOM, K, J)	CAL	2
	0 DIMENSION ACMO(10), AALCL(10), ACDO(10), AAO(10), ACLAD(10), ACMTAD(10)	CAL	3
	1, ACLREF(10), ACDSLP(10), ACMSLP(10), AADOD(10), AAMOM(10)	CAL	4
	COMMON L1, L2, L3, L4, L5, L6, L7, L8, NCHK	CAL	5
	COMMON X(16), N1, N2, CCMO, CALOL, CCDO, CAO, CCLAD, CCMTAD, CCLREF, CCDSLP,	CAL	6
	1CCMSLP, CADOD, CAMOM, CLCON, CDCON, CMCON, THX(16), FACTOR	CAL	7
		CAL	8
		CAL	9
	CCMO =ACMO(K-1) & FACTOR * (ACMO(K) - ACMO(K-1))	CAL	10
	CALOL =AALOL(K-1) & FACTOR * (AALOL(K)-AALOL(K-1))	CAL	11
	CCDO =ACDO(K-1) & FACTOR * (ACDO(K)-ACDO(K-1))	CAL	12
	CAO =AAO(K-1) & FACTOR * (AAO(K)-AAO(K-1))	CAL	13
	CCLAD =ACLAD(K-1) & FACTOR * (ACLAD(K) - ACLAD(K-1))	CAL	14
	CCMTAD =ACMTAD(K-1) & FACTOR * (ACMTAD(K) - ACMTAD(K-1))	CAL	15
	CCLREF =ACLREF(K-1) & FACTOR * (ACLREF(K)-ACLREF(K-1))	CAL	16
	CCDSLP=ACDSLP(K-1)&FACTOR*(ACDSLP(K)-ACDSLP(K-1))	CAL	17
	CCMSLP=ACMSLP(K-1)&FACTOR*(ACMSLP(K)-ACMSLP(K-1))	CAL	18
	CADOD=AADOD(K-1)&FACTOR*(AADOD(K)-AADOD(K-1))	CAL	19
	CAMOM=AAMOM(K-1)&FACTOR*(AAMOM(K)-AAMOM(K-1))	CAL	20
	CLCON=CCLREF&CAO*(THX(J)-CALOL)	CAL	21
	CDCON=CCDO&CCDSLP*(THX(J)-CADOD)	CAL	22
	CMCON=CCMO&CCMSLP*(THX(J)-CAMOM)	CAL	23
	RETURN	CAL	24
	END	CAL	25

C  
C



CZ9(NP1) = CZ9(1)	RV4 51
CZ11(NP1) = CZ11(1)	RV4 52
CZ12(NP1) = CZ12(1)	RV4 53
CB2(NP1) = CB2(1)	RV4 54
CB3(NP1) = CB3(1)	RV4 55
CB8(NP1) = CB8(1)	RV4 56
CB9(NP1) = CB9(1)	RV4 57
CB11(NP1) = CB11(1)	RV4 58
CB12(NP1) = CB12(1)	RV4 59
PSIR = C.	RV4 60
DO 100 I=1,NP1	1RV4 61
CT(I,1) = -CT3(I)	1RV4 62
CT(I,2) = -CT2(I) - CT3(I) * PSIR	1RV4 63
CT(I,3) = -CT9(I)	1RV4 64
CT(I,4) = -CT8(I) - CT9(I) * PSIR	1RV4 65
CT(I,5) = -CT12(I)	1RV4 66
CT(I,6) = -CT11(I) - CT12(I) * PSIR	1RV4 67
CZ(I,1) = -CZ3(I)	1RV4 68
CZ(I,2) = -CZ2(I) - CZ3(I) * PSIR	1RV4 69
CZ(I,3) = -CZ9(I)	1RV4 70
CZ(I,4) = -CZ8(I) - CZ9(I) * PSIR	1RV4 71
CZ(I,5) = -CZ12(I)	1RV4 72
CZ(I,6) = -CZ11(I) - CZ12(I) * PSIR	1RV4 73
CB(I,1) = -CB3(I)	1RV4 74
CB(I,2) = -CB2(I) - CB3(I) * PSIR	1RV4 75
CB(I,3) = -CB9(I)	1RV4 76
CB(I,4) = -CB8(I) - CB9(I) * PSIR	1RV4 77
CB(I,5) = -CB12(I)	1RV4 78
CB(I,6) = -CB11(I) - CB12(I) * PSIR	1RV4 79
100 PSIR = PSIR & DPSI	1RV4 80
C	RV4 81
C	RV4 82
C	RV4 83
C	RV4 84
C	RV4 85
C	RV4 86
REWIND L3	RV4 87
READ (L3)	RV4 88
READ (L3)	RV4 89
CALL TPREAD (L3,4,A1,A2,A3,A4,A4)	RV4 90
CALL TRMULT(DT,A1,CT,NP1,6,1)	RV4 91
CALL TRMULT(DT,A2,C7,NP1,6,2)	RV4 92
CALL TRMULT(DZ,A3,CT,NP1,6,1)	RV4 93
CALL TRMULT(DZ,A4,CZ,NP1,6,2)	RV4 94
CALL TPREAD(L3,5,A1,A2,A3,A4,A5)	RV4 95
CALL TRMULT(DT,A1,CB,NP1,6,2)	RV4 96
CALL TRMULT(DZ,A2,CB,NP1,6,2)	RV4 97
CALL TRMULT(DB,A4,CT,NP1,6,1)	RV4 98
CALL TRMULT(CB,A5,CZ,NP1,6,2)	RV4 99
CALL TRMULT(CB,A3,CB,NP1,6,2)	1RV4 100
DO 110 I=1,NP1	

DO 110 J=1,6	2RV4 101
DTSP(I,J)=DT(I,J)	2RV4 102
DZSP(I,J)=DZ(I,J)	2RV4 103
110 DBSP(I,J)=DB(I,J)	2RV4 104
120 CALL INTR(DT,DT2INT,DT,NP1,6,DPSI2)	RV4 105
CALL INTR(DZ,DZ2INT,DZ,NP1,6,DPSI2)	RV4 106
CALL INTR(DB,DB2INT,DB,NP1,6,DPSI2)	RV4 107
DO 130 I=1,NP1	1RV4 108
DT(I,2) = DT(I,2) & 1.0	1RV4 109
DZ(I,4) = DZ(I,4) & 1.0	1RV4 110
130 DB(I,6) = DB(I,6) & 1.0	1RV4 111
C	RV4 112
140 DO 150 I=1,NP1	1RV4 113
PSIR = PSI(I)/57.29578	1RV4 114
DT2INT(I,1) = DT2INT(I,1) & 1.0	1RV4 115
DT2INT(I,2) = DT2INT(I,2) & PSIR	1RV4 116
DZ2INT(I,3) = DZ2INT(I,3) & 1.0	1RV4 117
DZ2INT(I,4) = DZ2INT(I,4) & PSIR	1RV4 118
DB2INT(I,5) = DB2INT(I,5) & 1.0	1RV4 119
150 DB2INT(I,6) = DB2INT(I,6) & PSIR	1RV4 120
C	RV4 121
C	RV4 122
C	RV4 123
C	RV4 124
160 DO 170 I=1,6	1RV4 125
BCM(1,I) = -DT2INT(NP1,I)	1RV4 126
BCM(2,I) = -DT(NP1,I)	1RV4 127
BCM(3,I) = -DZ2INT(NP1,I)	1RV4 128
BCM(4,I) = -DZ(NP1,I)	1RV4 129
BCM(5,I) = -DB2INT(NP1,I)	1RV4 130
170 BCM(6,I) = -DB(NP1,I)	1RV4 131
NV = (NP1*(NP1&1))/2	RV4 132
NVO = (NP*(NP&1))/2	RV4 133
GO TO (180,440,180), NCPT	RV4 134
180 DO 400 L=1,NCYCL	1RV4 135
WRITE (L2,720) L	1RV4 136
IF(L-1) 190,190,210	1RV4 137
190 DO 200 NIC=1,6	2RV4 138
200 BCINIC(NIC) = BCINIT(NIC)	2RV4 139
GO TO 230	1RV4 140
210 DO 220 NTHC=1,6	2RV4 141
220 BCINIC(NTHC) = BCNTHC(NTHC)	2RV4 142
C	1RV4 143
230 DO 390 J=1,NP1	2RV4 144
DO 240 M=1,6	3RV4 145
240 BCNTHC(M) = 0.0	3RV4 146
DO 250 K=1,6	3RV4 147
BCNTHC(1) = BCNTHC(1) & DT2INT(J,K) * BCINIC(K)	3RV4 148
BCNTHC(2) = BCNTHC(2) & DT(J,K) * BCINIC(K)	3RV4 149
BCNTHC(3) = BCNTHC(3) & DZ2INT(J,K) * BCINIC(K)	3RV4 150

BCNTHC(4) = BCNTHC(4) & DZ(J,K) * BCINIC(K)	3RV4 151
BCNTHC(5) = BCNTHC(5) & CB?INT(J,K) * BCINIC(K)	3RV4 152
250 BCNTHC(6) = BCNTHC(6) & CB(J,K) * BCINIC(K)	3RV4 153
WRITE (L2,730) PSI(J), (BCNTHC(I), I=1,6)	2RV4 154
IF(J-1) 270,260,270	2RV4 155
260 AMAX1=ABS(BCNTHC(1))	2RV4 156
AMAX2=ABS(BCNTHC(2))	2RV4 157
AMAX3=ABS(BCNTHC(3))	2RV4 158
AMAX4=ABS(BCNTHC(4))	2RV4 159
AMAX5=ABS(BCNTHC(5))	2RV4 160
AMAX6=ABS(BCNTHC(6))	2RV4 161
PMAX1 = 0.0	2RV4 162
PMAX2 = 0.0	2RV4 163
PMAX3 = 0.0	2RV4 164
PMAX4 = 0.0	2RV4 165
PMAX5 = 0.0	2RV4 166
PMAX6 = 0.0	2RV4 167
GO TO 350	2RV4 168
270 ABBC=ABS(BCNTHC(1))	2RV4 169
IF(AMAX1-ABBC) 280,280,290	2RV4 170
280 AMAX1=ABBC	2RV4 171
PMAX1=PSI(J)	2RV4 172
290 ABBC=ABS(BCNTHC(2))	2RV4 173
IF(AMAX2-ABBC) 300,300,310	2RV4 174
300 AMAX2=ABBC	2RV4 175
PMAX2=PSI(J)	2RV4 176
310 ABBC=ABS(BCNTHC(3))	2RV4 177
IF(AMAX3-ABBC) 320,320,330	2RV4 178
320 AMAX3=ABBC	2RV4 179
PMAX3=PSI(J)	2RV4 180
330 ABBC=ABS(BCNTHC(4))	2RV4 181
IF(AMAX4-ABBC) 340,340,350	2RV4 182
340 AMAX4=ABBC	2RV4 183
PMAX4=PSI(J)	2RV4 184
350 ABBC=ABS(BCNTHC(5))	2RV4 185
IF(AMAX5-ABBC) 360,360,370	2RV4 186
360 AMAX5=ABBC	2RV4 187
PMAX5=PSI(J)	2RV4 188
370 ABBC=ABS(BCNTHC(6))	2RV4 189
IF(AMAX6-ABBC) 380,380,390	2RV4 190
380 AMAX6=ABBC	2RV4 191
PMAX6=PSI(J)	2RV4 192
390 CONTINUE	2RV4 193
WRITE (L2,670)	1RV4 194
WRITE (L2,680)	1RV4 195
WRITE (L2,690) PMAX1, AMAX1, PMAX2, AMAX2, PMAX3, AMAX3, PMAX4, AMAX4,	1RV4 196
PMAX5, AMAX5, PMAX6, AMAX6	1RV4 197
SMAX(L,1)=AMAX1	1RV4 198
SMAX(L,2)=AMAX2	1RV4 199
SMAX(L,3)=AMAX3	1RV4 200

	SMAX(L,4)=AMAX4	RV4 201
	SMAX(L,5)=AMAX5	RV4 202
	SMAX(L,6)=AMAX6	RV4 203
400	CONTINUE	RV4 204
C		RV4 205
	NOM = NCCYCL - 1	RV4 206
	DO 410 I = 1,6,2	RV4 207
	IF(ABS(SMAX(NCCYCL,I)/SPAX(NOM,I))-1.05) 410,410,420	RV4 208
410	CONTINUE	RV4 209
	GO TO (430,440,440), NCFI	RV4 210
420	WRITE (L2,700)	RV4 211
	CALL EXIT	RV4 212
430	WRITE (L2,710)	RV4 213
	CALL EXIT	RV4 214
C		RV4 215
C	THREE DEGREES OF FREEDOM - CALCULATION OF RESPONSE (E) MATRICES	RV4 216
C		RV4 217
C		RV4 218
C		RV4 219
440	REWIND L3	RV4 220
	READ (L3)	RV4 221
	READ (L3)	RV4 222
	REWIND L6	RV4 223
	DO 450 I=1,6	RV4 224
450	BCM(I,I) = BCM(I,I) & 1.0	RV4 225
	NTL = NV - NP1	RV4 226
	NBC1 = 6 & NP1	RV4 227
	NBC2 = NBC1 & 1	RV4 228
	NBC3 = NBC1 & NP1	RV4 229
	NBC4 = NBC3 & 1	RV4 230
	NBC5 = NBC3 & NP1	RV4 231
	CALL TPREAD(L3,3,A1,A2,A3,A3,A3)	RV4 232
	CALL INTT(A5,A4,A2,NP1,CPST2)	RV4 233
	J = NTL	RV4 234
	DO 460 I=NBC2,NBC3	RV4 235
	J = J & 1	RV4 236
	RCM(I,I) = A4(J)	RV4 237
460	RCM(2,I) = A5(J)	RV4 238
	CALL INTT(A5,A4,A1,NP1,CPST2)	RV4 239
	CALL INTT(A2,A1,A3,NP1,CPST2)	RV4 240
	J = NTL	RV4 241
	DO 470 I=7,NBC1	RV4 242
	J = J & 1	RV4 243
	RCM(1,I) = A4(J)	RV4 244
	RCM(2,I) = A5(J)	RV4 245
	BCM(3,I) = A1(J)	RV4 246
470	RCM(4,I) = A2(J)	RV4 247
	CALL TPREAD(L3,3,A1,A2,A3,A3,A3)	RV4 248
	CALL INTT(A5,A4,A1,NP1,CPST2)	RV4 249
	J = NTL	RV4 250

	DO 480 I=NBC2,NBC3	1RV4 251
	J = J & 1	1RV4 252
	BCM(3,I) = A4(J)	1RV4 253
480	BCM(4,I) = A5(J)	1RV4 254
	CALL INTT(A5,A4,A2,NP1,CPSI2)	RV4 255
	CALL INTT(A2,A1,A3,NP1,CPSI2)	RV4 256
	J = NTL	RV4 257
	DO 490 I=NBC4,NBC5	1RV4 258
	J = J & 1	1RV4 259
	BCM(1,I) = A4(J)	1RV4 260
	BCM(2,I) = A5(J)	1RV4 261
	BCM(3,I) = A1(J)	1RV4 262
490	BCM(4,I) = A2(J)	1RV4 263
	CALL TPREAD(L3,3,A1,A2,A3,A3,A3)	RV4 264
	CALL INTT(A5,A4,A1,NP1,CPSI2)	RV4 265
	J = NTL	RV4 266
	DO 500 I=NBC4,NBC5	1RV4 267
	J = J & 1	1RV4 268
	BCM(5,I) = A4(J)	1RV4 269
500	BCM(6,I) = A5(J)	1RV4 270
	CALL INTT(A5,A4,A2,NP1,CPSI2)	RV4 271
	J = NTL	RV4 272
	DO 510 I=7,NBC1	1RV4 273
	J = J & 1	1RV4 274
	BCM(5,I) = A4(J)	1RV4 275
510	BCM(6,I) = A5(J)	1RV4 276
	CALL INTT(A5,A4,A3,NP1,CPSI2)	RV4 277
	J = NTL	RV4 278
	DO 520 I=NBC2,NBC3	1RV4 279
	J = J & 1	1RV4 280
	BCM(5,I) = A4(J)	1RV4 281
520	BCM(6,I) = A5(J)	1RV4 282
		RV4 283
C	530 DO 570 K=1,6	1RV4 284
	PVT = BCM(K,K)	1RV4 285
	DO 540 J=K,NBC5	2RV4 286
540	BCM(K,J) = BCM(K,J) / PVT	2RV4 287
		1RV4 288
	DO 570 I=1,6	2RV4 289
	TRM = BCM(I,K)	2RV4 290
	IF(I-K) 550,570,550	2RV4 291
550	DO 560 J=K,NBC5	3RV4 292
560	BCM(I,J) = BCM(I,J) - BCM(K,J) * TRM	3RV4 293
570	CONTINUE	2RV4 294
	DO 580 I=1,6	1RV4 295
		1RV4 296
	BCM(I,7)=BCM(I,7)+BCM(I,NBC1)	1RV4 297
	BCM(I,NBC2)= BCM(I,NBC2) & BCM(I,NBC3)	1RV4 298
580	BCM(I,NBC4)= BCM(I,NBC4) & BCM(I,NBC5)	1RV4 299
		RV4 300
C		

C  
C  
C

```
NBC1 = NBC1 - 1
NBC3 = NBC3 - 1
NBC5 = NBC5 - 1
REWIND L7
DO 610 I = 1,6
  J = 0
  DO 590 J1 = 7,NBC1
    J = J & 1
590 ET(I,J) = BCM(I,J1)
    J = 0
    DO 600 J2 = NBC2,NBC3
      J = J & 1
600 EZ(I,J) = BCM(I,J2)
    J = 0
    DO 610 J3 = NBC4,NBC5
      J = J & 1
610 EB(I,J) = BCM(I,J3)
    DO 620 I=1,6
620 WRITE (L7) (ET(I,J),J=1,NP), (EZ(I,J),J=1,NP), (EB(I,J),J=1,NP),
  1 (DTSP(L,I),DZSP(L,I),CRSP(L,I),L=1,NP)
630 REWIND L4
  REWIND L3
  READ (L3)
  READ (L2)
  CALL TPRFAD (L3,5,A1,A2,A3,A4,A5)
  WRITE (L4) A1
  WRITE (L4) A2
  WRITE (L4) A5
  WRITE (L4) A3
  WRITE (L4) A4
  CALL TPREAD(L3,4,A1,A2,A3,A4,A4)
  WRITE (L4) A1
  WRITE (L4) A3
  WRITE (L4) A4
  WRITE (L4) A2
640 REWIND L4
  NX = NX2 - NX1 & 1
  WRITE (L7) NP,NX,E1,F2,R,FDAMP,BDAMP,ZDAMP,DPSI2,CO,RHO,
  1 GAMMA2,REFM,(X(I),XX1(I),XX(I),CC(I),THX(I),EM(I),XA(I),
  2 FA(I), I=NX1,NX2),(AMSI(I),I=1,9),ZSPRNG,BSPRNG,
  3 AKTB,FCNSP,(TCR(I),TOT(I),TOZ(I),
  4 PSI(I),SPSI(I),CPSI(I),I=1,NP),FSPRNG,AKTZ,DPSI
  DO 650 K=1,3
  CALL TPREAD(L4,3,A1,A2,A3,A4,A5)
650 WRITE (L7) NV0, (A1(I), A2(I), A3(I), I=1,NV0)
  GCON=-AKTB*FCNSP
  BCON=-FCNSP*AKTZ
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RV4 301  
RV4 302  
RV4 303  
RV4 304  
RV4 305  
RV4 306  
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1RV4 309  
2RV4 310  
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RV4 350

ACON=FCASP*AKTZ*AKTR	RV4 351
DO 660 I=1,NP	RV4 352
CB3(I)=CB3(I)-CCCN	RV4 353
CB9(I)=CB9(I)-ACON	RV4 354
CB11(I)=CB11(I)-BDAMP	RV4 355
CT2(I)=CT2(I)-FDAMP	RV4 356
CT3(I)=CT3(I)-FSPRNG-FCASP	RV4 357
CT9(I)=CT9(I)-BCON	RV4 358
CT12(I)=CT12(I)-CCCN	RV4 359
CZ3(I)=CZ3(I)-BCON	RV4 360
CZ8(I)=CZ8(I)-ZDAMP	RV4 361
CZ9(I)=CZ9(I)-ZSPRNG-FCASP*AKTZ	RV4 362
CZ12(I)=CZ12(I)-ACCN	RV4 363
660 CB12(I)=CB12(I)-BSPRNG-FCASP*AKTR*AKTR	RV4 364
WRITE (L7) (CT1(I),CT2(I),CT3(I),CT7(I),CT8(I),CT9(I),CT10(I),	RV4 365
1 CT11(I),CT12(I),CZ1(I),CZ2(I),CZ3(I),CZ7(I),CZ8(I),CZ9(I),	RV4 366
2 CZ10(I),CZ11(I),CZ12(I),CB1(I),CB2(I),CB3(I),CB7(I),CB8(I),	RV4 367
3 CB9(I),CB10(I),CB11(I),CB12(I),I=1,NP)	RV4 368
REWIND L3	RV4 369
REWIND L7	RV4 370
REWIND L6	RV4 371
C	RV4 372
C	RV4 373
C	RV4 374
C	RV4 375
END OF RESPONSE MATRIX CALCULATIONS .	RV4 376
RETURN	RV4 377
C	RV4 378
C	RV4 379
C	RV4 380
670 FORMAT(26H MAXIMUM ABSOLUTE RESPNSF/)	RV4 381
680 FORMAT(4X,3HPSI,12X,1HT,13X,2HTP,12X,1HZ,13X,2HZP,12X,1HB,13X,2HBP	RV4 382
1/)	RV4 383
690 FORMAT(F8.1,1PF17.3/OPF8.1,1PF31.3/OPF8.1,1PE45.3/OPF8.1,1PE59.3/	RV4 384
1 OPF8.1,1PE73.3/OPF8.1,1PE87.3)	RV4 385
700 FORMAT(34H DIVERGENCE CONDITION DISCONTINUED)	RV4 386
710 FORMAT (27H END OF JOB--STABILITY ONLY//)	RV4 387
720 FORMAT(1H1,53X,13HTIME HISTORY//	RV4 388
153X,11HCYCLE NC. =I3 //4X,3HPSI,12X,1HT,13X,2HTP,12X,1HZ,	RV4 389
213X,2HZP,12X,1HB,13X,2HBP)	RV4 390
730 FORMAT(F7.1,3X,(1P6E14.3 ))	RV4 391
END	

C	SUBROUTINE TRMLLT (A,B,C,N,NR,IC)	TRM	1
C		TRM	2
C	A=B*C	TRM	3
C	WHERE B IS LOWER TRIANGLE OF NOMINAL ORDER N	TRM	4
C	STORED AS VECTOR	TRM	5
C	A,C ARE RECTANGULAR OF ORDER N X NR	TRM	6
C	N MAX = 25    NR MAX = 6	TRM	7
C	IC=1 A=B*C    IC=2 A=A&B*C    IC=3 A=-A&B*C	TRM	8
	DIMENSION A(25,6),B(325),C(25,6)	TRM	9
	DO 130 J=1,NR	1TRM	10
	IB=0	1TRM	11
	DO 130 I=1,N	2TRM	12
	GO TO (100,120,110), IC	2TRM	13
100	A(I,J)=C.0	2TRM	14
	GO TO 120	2TRM	15
110	A(I,J)=-A(I,J)	3TRM	16
120	DO 130 K=1,I	3TRM	17
	IB=IB&1	3TRM	18
130	A(I,J)=A(I,J)&DBLE(B(IB))*DELE(C(K,J))	TRM	19
	RETURN	TRM	20
	END		

C	SUBROUTINE INTR(A,B,C,M,N,H2)	INR	1
C		INR	2
C	A=INT OF C      B=2ND INT OF C      BY TRAPEZOIDAL RULF	INR	3
C	A,B,C ARE RECTANGULAR MATRICES    M X N      MAX 25 X 6	INR	4
C	H2 IS CCNSTANT HALF INTERVAL	INR	5
C	A OR B MAY BE EQUAL TO C	INR	6
C	IF A AND B ARE EQUAL      RESULT WILL BE 1ST INTEGRAL	INR	7
C		INR	8
	DIMENSION A(25,6),B(25,6),C(25,6)	INR	9
	DO 100 J=1,N	1INR	10
	TC=C(I,J)	1INR	11
	B(I,J)=0.0	1INR	12
	A(I,J)=0.0	1INR	13
	TA=0.0	1INR	14
	TB=0.0	1INR	15
	DO 100 I=2,M	2INR	16
	TT=TA&H2*(C(I,J)&TC)	2INR	17
	TB=TB&H2*(TA&TT)	2INR	18
	TA=TT	2INR	19
	TC=C(I,J)	2INR	20
	B(I,J)=TB	2INR	21
100	A(I,J)=TA	2INR	22
	RETURN	INR	23
	END	INR	24

	SUBROUTINE TPRFAD(NT,NM,A,B,C,D,E)	TPR	1
	TPREAD(NT,NM,A,B,C,D,E)	TPR	2
	READS TAPE NT , NM VECTORS OF 325 WORDS	TPR	3
C		TPR	4
C		TPR	5
C		TPR	6
	DIMENSION A(325),B(325),C(325),D(325),E(325)	TPR	7
	READ (NT) A	TPR	8
	IF (NM-1) 100,140,100	TPR	9
100	READ (NT) B	TPR	10
	IF (NM-2) 110,140,110	TPR	11
110	READ (NT) C	TPR	12
	IF (NM-3) 120,140,120	TPR	13
120	READ (NT) D	TPR	14
	IF (NM-4) 130,140,130	TPR	15
130	READ (NT) E	TPR	16
140	RETURN		
	END		

	SUBROUTINE INTT(A,B,C,N,H2)	INT	1
C	A=INT OF C      B=2ND INT OF C      BY TRAPEZOIDAL RULF	INT	2
C	A,B,C ARE TRIANGULAR MATRICES STORED AS VECTORS	INT	3
C	H2 IS CONSTANT HALF INTERVAL      N IS NOMINAL ORDER , MAX=25	INT	4
C	A OR B MAY EQUAL C	INT	5
C	IF A AND B ARE EQUAL      RESULT WILL BE 1ST INTEGRAL	INT	6
C	SENSE LIGHT 4 IS OFF ON EXIT	INT	7
		INT	8
	DIMENSION A(325),B(325),C(325)	INT	9
	CALL SLITE(4)	INT	10
	II=0	INT	11
	DO 120 J=1,N	1INT	12
	IIO=IIOGJ	1INT	13
	TA=0.0	1INT	14
	TB=0.0	1INT	15
	TC=0.0	1INT	16
	II=IIO	1INT	17
	DO 120 I=J,N	2INT	18
	CALL SLITET(4,K)	2INT	19
	GO TO (110,100), K	2INT	20
100	TT=TA&H2*(C(III)+TC)	2INT	21
	TB=TB&H2*(TA&TT)	2INT	22
	TA=TT	2INT	23
110	TC=C(III)	2INT	24
	B(III)=TB	2INT	25
	A(III)=TA	2INT	26
120	II=IIOI	2INT	27
	RETURN	INT	28
	END	INT	29

C  
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SUBROUTINE REV05
COMMON L1, L2, L3, L4, L5, L6, L7, L8, NCHK
DIMENSION TBR(24),TBPB(24),TBPB(24),TZPPT(24),TZZ(24),TZPZ(24),
1 TZPPZ(24),TBZ(24),TBPZ(24),TBPZ(24),TTZ(24),TTPZ(24),TTPPZ(24),
2 TTB(24),TTPB(24),TTPPB(24),TZB(24),TZPB(24),TZPPB(24),TBT(24),
3 TBPT(24),TBPPT(24),TTT(24),TTPT(24),TTPPT(24),TZT(24),TZPT(24),
4 ALAM(12,24),B(24),BD(24),BDD(24),TH(24),THD(24),
5 THDD(24),Z(24),ZD(24),ZCD(24),
6 TOR(24),TOT(24),TOZ(24),THIN(24),DIOX(12,24),DMOX(12,24),
7 DZDX(12,24),PSI(24),SPSI(24),CPSI(24),XA(12),X(12),XXI(12),
8 C(12),TWIST(12),AI(5),S(3),XH(12),XXL(12),XR(12),
9 ALFAC(12,24),AMACH(10),ASTLN(10),ASTLP(10),ALFA(36),
1 DPDXI(12,24),DPDXP(12,24),DPDSII(24),DPDSIP(24),DQDSII(24),
2 DQDSIP(24),DTPSI(24),DYMPSI(24),DQDPSI(24),DPDPSI(24),
3 DM(4),CQ(4),CCF(3,3),ABC(3),
4 DOUTDR(12,24),DINDR(12,24),CMB(12),FB(24),FT(24),FZ(24)
DIMENSION FT1(24),FB1(24),FZ1(24),RADN(10),
1 AMUC(12,24),RHOC(12,24),XYZ(8,12),VLL(12,24)
DIMENSION
1 CL(48,8,6),CD(48,8,6),CM(48,8,6),CB(24),
2 STH(24),CTH(24),UP(12,24),HFAD(17),SR(24),AMACH(12,24),XJ2(12),
3 BC(6),THC(24),BDO(24),ZDO(24),FB(6,24),ET(6,24),
4 EZ(6,24),DB(24,6),DT(24,6),DZ(24,6),PT1(300),
5 PT3(300),PT4(300),SZ(24),CZ(24)
REWIND L3
REWIND L5
REWIND L6
REWIND L7
READ (L3) LCCN,NXF2,NP,((ALAM(J,I),AMUC(J,I),RHOC(J,I),J=1,NXF2),
1 I=1,NP)
READ (L3) NTOB,Q2,P2,CMFGA,ALAMO,AMU
RFAD (L5)
RFAD (L5)IC,NITR,TOA,BCA,ZOA,APHASE,ALFAR,LSS2,HEAD,
1 AOS,AIS,BIS,BTOL,ATCLP, NCASF,NAERO,LFAR,
2 NDAL,NCMN,NOSEC,ALL,ALH,DELAL,(ALFA(I),I=1,NOAL),X1,X2,
3 (AMACH(I),ASTLP(I),ASTLN(I),I=1,NOMN),(RADN(I),I=1,NOSEC),
4 XQ,FCPO,FCHO,PL,INTAN,ANARB,NCFAR,CDOR,CREF,
5 BEQ,REQ,AMINF,TIN,UR,GAMM,NM,XREF,DRFF
WRITE(L2,100)HFAD

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PV5 1  
RV5 2  
RV5 3  
RV5 4  
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RV5 49  
RV5 50

100	FORMAT(1H ,17A4)	RV5	51
110	DO 120 I=1,NP	1RV5	52
	FT(I)=0.0	1RV5	53
	FB(I)=0.0	1RV5	54
	FZ(I)=0.0	1RV5	55
	TH(I)=0.0	1RV5	56
	THD(I)=0.0	1RV5	57
	B(I)=0.0	1RV5	58
	BD(I)=0.0	1RV5	59
	Z(I)=0.0	1RV5	60
120	ZD(I)=0.0	1RV5	61
	DO 130 I=1,e	1RV5	62
130	READ (L7) (FT(I,J),J=1,NP), (EZ(I,J),J=1,NP), (EB(I,J),J=1,NP),	1RV5	63
	1 (DT(J,I),DZ(J,I),DB(J,I),J=1,NP)	RV5	64
	IF(NAERC) 180,140,180	RV5	65
140	DO 150 JJ=1,NOSEC	1RV5	66
	DO 150 MM=1,NCMN	2RV5	67
150	READ (L5) (CL(II,MM,JJ),II=1,NOAL)	2RV5	68
	DO 160 JJ=1,NOSEC	1RV5	69
	DO 160 MM=1,NCMN	2RV5	70
160	READ (L5) (CD(II,MM,JJ),II=1,NOAL)	2RV5	71
	DO 170 JJ=1,NOSEC	1RV5	72
	DO 170 MM=1,NCMN	2RV5	73
170	READ (L5) (CM(II,MM,JJ),II=1,NOAL)	2RV5	74
180	READ (L7) NP,NX,E1,E2,R,FCAMP,BDAMP,ZDAMP,DPSI2,CO,RHO,	RV5	75
	1 GAMMA2,REFM,(X(I),XXL(I),XXI(I),C(I),TWIST(I),DMB(I),XA(I),	RV5	76
	2 XH(I),I=1,NX),AM,(S(I),I=1,3),(AI(I),I=1,5),ZSPRNG,	RV5	77
	3 BSPRNG,AKTB,FCNSP,(TOE(I),TOT(I),TOZ(I),	RV5	78
	4 PSI(I),SPSI(I),CPSI(I),I=1,NP),FSPRNG,AKTZ,DPSI	RV5	79
	REWIND L6	RV5	80
	E21=E2-F1	RV5	81
	READ (L6) AOS,NCI,NIOM,IKCM,KOM,CQTOL,NCHK,(CQ(I),OM(I),I=1,3)	RV5	82
190	OMEGA=CMEGA*R	RV5	83
	ITERB=0	RV5	84
	IF(IKOM-1) 220,200,220	RV5	85
200	CORR = AI(1) * OMEGA * OMEGA	RV5	86
	FSPRNG = FSPRNG * CORR	RV5	87
	ZSPRNG=ZSPRNG*CORR	RV5	88
	BSPRNG=BSPRNG*CORR	RV5	89
	FCNSP=FCNSP*CORR	RV5	90
	DCORR=CORR/CMEGA	RV5	91
	FDAMP = FDAMP *DCORR	RV5	92
	ZDAMP=ZDAMP*DCORR	RV5	93
	BDAMP=BDAMP*DCORR	RV5	94
	WRITE (L2,1260) R,E1,AI(1),PL	RV5	95
	WRITE (L2,1270) AMU,ALAND,AOS,AIS,BIS	RV5	96
	WRITE (L2,1250) FCP0,FCH0	RV5	97
	WRITE(L2,210) CMEGAR,RHC,FSPRNG,ZSPRNG,BSPRNG,FDAMP,ZDAMP,BDAMP,	RV5	98
	1 FCNSP	RV5	99
210	FORMAT(5X,22AERODYNAMIC PARAMETERS/11H TIP SPEED=FB.2.6HFT/SEC,5X	RV5	100

114H	DENSITY RATIO=F6.3//26H	SPRING RATES (FT LBS/RAD)/5X,11HFEATHFR	RV5 101
21NG	=F9.1/12X,4HLAG=F9.1/7X,9HFLAPPING=F9.1//		RV5 102
331H	DAMPING RATES (FT LBS/RAD/SEC)/5X,11HFEATHERING=F9.1/		RV5 103
412X	,4HLAG=F9.1/7X,9HFLAPPING=F9.1//		RV5 104
534H	CONTROL SPRING RATES (FT LBS/RAD)/5X,11HFEATHERING=F9.1//1		RV5 105
	FSPRNG=FSPRNG/CORR		RV5 106
	ZSPRNG=ZSPRNG/CORR		RV5 107
	BSPRNG=BSPRNG/CORR		RV5 108
	FCNSP=FCNSP/CORR		RV5 109
	BDAMP=BDAMP/OCCRR		RV5 110
	ZDAMP=ZDAMP/OCCRR		RV5 111
	FDAMP=FCAMP/OCCRR		RV5 112
220	CRET=CRET/CO		RV5 113
	OMSQ=OMEGA*CMEGA		RV5 114
	OMSQ2=2.0*OMSQ		RV5 115
	DMRSQ=OMSQ*R*R		RV5 116
	CONST=3.1416*CMRSQ*R*R*.002378		RV5 117
	ACONST=CMRSQ*5.73*CO*.001189		RV5 118
	ANP=NP		RV5 119
	BFLN=BL/ANP		RV5 120
	CCONST=ACONST*R*BFLN		RV5 121
	DD 230 J=1,NX		RV5 122
	XYZ(1,J)=X(J)		RV5 123
	XYZ(2,J)=C(J)		RV5 124
	XYZ(3,J)=XH(J)		RV5 125
	XYZ(4,J)=XA(J)		RV5 126
	XYZ(5,J)=XXI(J)		RV5 127
	XYZ(6,J)=XXL(J)		RV5 128
	XYZ(7,J)=TWIST(J)		RV5 129
230	XY7(8,J)=DMR(J)		RV5 130
	DD 240 J=1,NX		RV5 131
	J2=J&2		RV5 132
	X(J2)=XYZ(1,J)		RV5 133
	XR(J2)=X(J2)*R		RV5 134
	C(J2)=XYZ(2,J)		RV5 135
	XH(J2)=XYZ(3,J)		RV5 136
	XA(J2)=XYZ(4,J)		RV5 137
	XXI(J2)=XYZ(5,J)		RV5 138
	XXL(J2)=XYZ(6,J)		RV5 139
	TWIST(J2)=XYZ(7,J)		RV5 140
240	DMR(J2)=XYZ(8,J)		RV5 141
	X(1)=X1		RV5 142
	X(2)=X2		RV5 143
	C(1)=CRET		RV5 144
	C(2)=CRET		RV5 145
	XXI(1)=0.0		RV5 146
	XXI(2)=0.0		RV5 147
	XE21=X2-X1		RV5 148
	DD 250 I=1,NP		RV5 149
	PS =(PSI(I)&APHASE)/57.2958		RV5 150

250	THIN(I)=(ACS-AIS*COS(PS)-BIS*SIN(PS))/57.2958	1RV5	151
260	IF(IIFR-1) 27C,290,29C	RV5	152
270	DO 280 I=1,NP	1RV5	153
	FZ(I)=TCZ(I) -AKTZ*FCNSP*THIN(I)&ZSPRNG*ZOA	1RV5	154
	FB(I)=TCB(I) -AKTB*FCNSP*THIN(I)&BSPRNG*BOA	1RV5	155
	FT(I)=TOT(I) &FCNSP*THIN(I)&FSPRNG*TOA	1RV5	156
280	CONTINUE	1RV5	157
290	ITERB=ITERB&1	RV5	158
C	CALCULATE RETA,BETAD,TH,THD,ZETA,ZFTAD TEST FOR CONVERGENCE.	RV5	159
C	ICLK=0 IF ALL NON ZERO VALUES ARE WITHIN SPECIFIED TOLERANCE,OTHER	RV5	160
C	WISE ICHK=1	RV5	161
C	INTEGRATIONS PERFORMED BY TRAPEZOIDAL RULE	RV5	162
C		RV5	163
C	CALCULATE PERIODIC INITIAL CONDITIONS AND INITIALIZE	RV5	164
C		RV5	165
	DO 300 I=1,6	1RV5	166
	RC(I)=0.0	1RV5	167
	DO 300 J=1,NP	2RV5	168
300	BC(I)=ET(I,J)*FT(J)&EZ(I,J)*FZ(J)&EB(I,J)*FB(J)&EC(I)	2RV5	169
	DO 310 I=1,NP	1RV5	170
	BDD(I)=0.0	1RV5	171
	THDD(I)=0.0	1RV5	172
	ZDD(I)=0.0	1RV5	173
	DO 310 J=1,6	2RV5	174
	BDD(I)=DB(I,J)*BC(J)&BCC(I)	2RV5	175
	ZDD(I)=DZ(I,J)*BC(J)&ZCC(I)	2RV5	176
310	THDD(I)=DT(I,J)*RC(J)&THDC(I)	2RV5	177
	DO 350 JKK=1,3	1RV5	178
	READ (L7) NV0,(PT1(I),FT3(I),PT4(I),I=1,NV0)	1RV5	179
	JK=0	1RV5	180
	DO 350 I=1,NP	2RV5	181
	DO 350 J=1,I	3RV5	182
	JK=JK&1	3RV5	183
	GO TO (320,330,340), JKK	3RV5	184
320	THDD(I)=PT1(JK)*FT(J)&PT3(JK)*FZ(J)&PT4(JK)*FB(J)&THDD(I)	3RV5	185
	GO TO 350	3RV5	186
330	ZDD(I)=PT1(JK)*FT(J)&PT2(JK)*FZ(J)&PT4(JK)*FB(J)&ZDD(I)	3RV5	187
	GO TO 350	3RV5	188
340	BDD(I)=PT1(JK)*FT(J)&PT2(JK)*FZ(J)&PT4(JK)*FB(J)&BDD(I)	3RV5	189
350	CONTINUE	3RV5	190
	THO =RC(1)	RV5	191
	THDD(1) =RC(2)	RV5	192
	ZO =RC(3)	RV5	193
	ZDD(1) =RC(4)	RV5	194
	RO =RC(5)	RV5	195
	BDD(1) =RC(6)	RV5	196
	ICLK=0	RV5	197
	DO 500 I=1,NP	1RV5	198
	IF(I-1) 36C,37C,360	1RV5	199
360	BDD(I)=BDD(I-1)&(BDD(I)&BDD(I-1))*OPST2	1RV5	200

	THD(I)=THD(I-1)&(THDC(I)&THDC(I-1))*DPSI2	1RV5 201
	ZD(I)=ZD(I-1)&(ZDC(I)&ZDC(I-1))*DPSI2	1RV5 202
	THO=THO&(THDO(I)&THDO(I-1))*DPSI2	1RV5 203
	ZO=ZO&(ZDO(I)&ZDO(I-1))*DPSI2	1RV5 204
	BO=BO&(BDO(I)&BDO(I-1))*DPSI2	1RV5 205
37C	DBETA=BDO(I)-BO(I)	1RV5 206
	DTHD =BO-B(I)	1RV5 207
	DTHD =THD(I)-TH(I)	1RV5 208
	DTH =THO-TH(I)	1RV5 209
	DZETA=ZD(I)-Z(I)	1RV5 210
	DZETA = ZO - Z(I)	1RV5 211
	IF(ABS(DBETA)-ATOLB) 40C,40C,380	1RV5 212
380	IF(BO) 390,46C,390	1RV5 213
390	IF(ABS(DBETA/BO)-BTOL) 40C,400,460	1RV5 214
400	IF(ABS(DTH)-ATCLB) 430,430,410	1RV5 215
410	IF(THO) 42C,46C,420	1RV5 216
420	IF(ABS(DTH/THO)-BTOL) 430,430,460	1RV5 217
430	IF(ABS(DZETA)-ATOLB) 450,450,440	1RV5 218
440	IF(ZO) 450,460,450	1RV5 219
45C	IF(ABS(DZETA/ZO)-BTOL) 470,470,460	1RV5 220
460	ICLK=1	1RV5 221
470	BD (I)=BDO(I)	1RV5 222
	B (I)=BO	1RV5 223
	IF (ABS(B(I))-1.57) 48C,48C,1080	1RV5 224
480	THD (I)=THDO(I)	1RV5 225
	TH (I)=THO	1RV5 226
	ZD(I)=ZDO(I)	1RV5 227
	Z (I)=ZC	1RV5 228
49C	CB(I)=CCS(B(I))	1RV5 229
	SB(I)=SIN(B(I))	1RV5 230
	STH(I)=SIN(TH(I))	1RV5 231
	CTH(I)=COS(TH(I))	1RV5 232
	SZ(I)=SIN(Z(I))	1RV5 233
	CZ(I)=CCS(Z(I))	1RV5 234
500	CONTINUE	1RV5 235
C		RV5 236
C	CALCULATES NON DIMENSIONAL DTDX(R,PSI),DMDX(R,PSI)	RV5 237
C		RV5 238
C		RV5 239
	DO 1040 I=1,NP	1RV5 240
	PS=PSI(I)/57.2958	1RV5 241
	SPSZ=SIN(PS&Z(I))	1RV5 242
	CPSZ = CCS(PS&Z(I))	1RV5 243
	Q2P2 = .5 * (Q2*CPSI(I)-P2*SPSI(I))	1RV5 244
	DO 1040 J=1,NXF2	2RV5 245
	IF (J-2) 51C,520,530	2RV5 246
510	UP(J,I)=ALAM(J,I)	2RV5 247
	UT=XIGAMUC(J,I)*SPSI(I)	2RV5 248
	GO TO 540	2RV5 249
520	UP(J,I)=ALAM(J,I)	2RV5 250

UT=X2&AMUC(J,I)*SPSZ&XE21*ZC(I)	2PV5 251
GO TO 540	2PV5 252
530 UP(J,I)=ALAM(J,I)*C9(I)-XXI(J)*PC(I)-AMUC(J,I)*CPSZ*SB(I)	2PV5 253
1&X(J)*Q2P2	2PV5 254
XCB=XXI(J)*CB(I)	2PV5 255
UT=X1&XCR&XE21&AMUC(J,I)*SPSZ&ZC(I)*(XF21&XCB)	2PV5 256
540 IF(UT) 550,620,550	2PV5 257
550 UPT=UP(J,I)/LT	2PV5 258
560 ABUPT=ABS(UPT)	2PV5 259
IF(UT) 570,620,660	2PV5 260
570 IF(UPT(J,I)) 580,610,580	2PV5 261
580 IF(ABUPT-0.2) 590,590,600	2PV5 262
590 PHI=UPT&3.14159	2PV5 263
GO TO 730	2PV5 264
600 PHI=ATAN(UPT)&3.14159	2PV5 265
GO TO 730	2PV5 266
610 PHI=3.14159	2PV5 267
GO TO 730	2PV5 268
620 IF(UPT(J,I)) 630,640,650	2PV5 269
630 PHI=4.71239	2PV5 270
GO TO 730	2PV5 271
640 PHI=0.0	2PV5 272
GO TO 730	2PV5 273
650 PHI=1.57080	2PV5 274
GO TO 730	2PV5 275
660 IF(UPT(J,I)) 700,640,670	2PV5 276
670 IF(ABUPT-0.2) 680,680,690	2PV5 277
680 PHI=UPT	2PV5 278
GO TO 730	2PV5 279
690 PHI=ATAN(UPT)	2PV5 280
GO TO 730	2PV5 281
700 IF(ABUPT-0.2) 710,710,720	2PV5 282
710 PHI=UPT&6.28318	2PV5 283
GO TO 730	2PV5 284
720 PHI=ATAN(UPT)&6.28318	2PV5 285
730 U=SQRT(LT*UTEUF(J,I)*UP(J,I))	2PV5 286
VLL(J,I) = U	2PV5 287
IF(J-2) 740,740,750	2PV5 288
740 CDC=C00R	2PV5 289
GO TO 960	2PV5 290
750 ALFAC(J,I)=TH(I)&TWIST(J)&PHI	2PV5 291
760 AMACHC(J,I)=L/PEFM	2PV5 292
DO 770 N=2,NCMN	3PV5 293
IF(AMACHC(J,I)-AMACH(M)) 780,780,770	3PV5 294
770 CONTINUE	3PV5 295
M=NMN	2PV5 296
780 AMACHD=(AMACHC(J,I)-AMACH(M-1))/(AMACH(M)-AMACH(M-1))	2PV5 297
DO 790 N=2,NCSEC	3PV5 298
IF(XI(N)-RACN(NS)) 800,800,790	3PV5 299
790 CONTINUE	3PV5 300

NS=NOSEC	2RV5 301
800 RADN = (X(J)-RADN(NS-1))/(RADN(NS)-RADN(NS-1))	2RV5 302
IF(ALFAC(J,I)) 810,850,820	2RV5 303
810 ALFAC(J,I)=ALFAC(J,I)&6.28318	2RV5 304
GO TO 840	2RV5 305
820 IF(ALFAC(J,I)-6.28318) 840,840,830	2RV5 306
830 ALFAC(J,I)=ALFAC(J,I)-6.28318	2RV5 307
840 IF(ALFAC(J,I)-3.14159) 850,850,910	2RV5 308
850 ASTALP=ASTLP(M-1)&AMACHD*(ASTLP(M)-ASTLP(M-1))	2RV5 309
IF(NAERC) 860,870,860	2RV5 310
860 CALL AERDAT (DMY)	2RV5 311
GO TO 96C	2RV5 312
87C DO 880 IJ=2,NOAL	3RV5 313
IF(ALFAC(J,I)-ALFA(IJ)) 890,890,880	3RV5 314
880 CONTINUE	3RV5 315
IJ=NOAL	2RV5 316
890 ALFAD=(ALFAC(J,I)-ALFA(IJ-1))/(ALFA(IJ)-ALFA(IJ-1))	2RV5 317
900 IF(ALFAC(J,I)-ASTALP) 950,950,940	2RV5 318
910 ASTALN=ASTLN(M-1)&AMACHD*(ASTLN(M)-ASTLN(M-1))	2RV5 319
DO 920 IK=1,NCAL	3RV5 320
IJ=NOAL-1K	3RV5 321
IF(ALFAC(J,I)-ALFA(IJ)) 920,930,930	3RV5 322
920 CONTINUE	3RV5 323
930 ALFAD=(ALFAC(J,I)-ALFA(IJ))/(ALFA(IJ&1)-ALFA(IJ))	2RV5 324
IJ=IJ&1	2RV5 325
IF(ALFAC(J,I)-ASTALN) 940,950,950	2RV5 326
940 M=2	2RV5 327
AMACHD=C.	2RV5 328
950 CALL INTLIN(AMACHD,ALFAC,RADN,CL,IJ,M,NS,CLC)	2RV5 329
CALL INTLIN(AMACHD,ALFAC,RADN,CC,IJ,M,NS,CDC)	2RV5 330
CALL INTLIN(AMACHD,ALFAC,RADN,CM,IJ,M,NS,CMC)	2RV5 331
96C CR=C(J)*C0	2RV5 332
UC=U+C(J)*RHOC(J,I)	2RV5 333
UCU=UC*L	2RV5 334
DPDX(J,I)=LC*CDC*UT	2RV5 335
IF(J-2) 97C,98C,1000	2RV5 336
97C DTDX(J,I)=C.0	2RV5 337
DZDX(J,I)=0.0	2RV5 338
GO TO 95C	2RV5 339
98C DTDX(J,I) = UC*CDC*UP(J,I)	2RV5 340
DZDX(J,I)=-LC*XE21*CDC*LT	2RV5 341
990 DPDXI(J,I) = 0.0	2RV5 342
DMDX(J,I) = 0.0	2RV5 343
GO TO 1040	2RV5 344
1000 CLCD = CLC * COS(ALFAC(J,I)) & CDC * SIN (ALFAC (J,I))	2RV5 345
DMDX(J,I)=UCU*CR*(XA(J)*CLCD &CMC)/R	2RV5 346
DTDX(J,I)= LC *(CLC*UT&CDC*UP(J,I))	2RV5 347
DPDXI(J,I)=-UC*CLC*UP(J,I)	2RV5 348
DZDX(J,I)=UC*XX(J) *(CLC*LP(J,I)-CDC*UT)	2RV5 349
1010 IF(ALFAC(J,I)-3.14159) 1030,1030,1020	2RV5 350

1020	ALFAC(J,I)=(ALFAC(J,I)-6.28318)*57.2958	2RV5 351
	GO TO 1040	2RV5 352
1030	ALFAC(J,I)=ALFAC(J,I)*57.2958	2RV5 353
1040	CONTINUE	2RV5 354
1050	IF (ICLK) 1060,1100,1060	RV5 355
1060	IF(ITERB&1-NITB) 1070,1070,1090	RV5 356
1070	IF(LSS2) 1130,1100,1130	RV5 357
1080	WRITE (L2,1280)	RV5 358
	CALL EXIT	RV5 359
1090	WRITE (L2,1290)	RV5 360
	CALL EXIT	RV5 361
1100	WRITE (L2,1300) ITERB	RV5 362
	WRITE (L2,1310)(PSI(I),B(I),TH(I),Z(I),I=1,NP)	RV5 363
	WRITE (L2,1220) (XR(J),J=3,NXF2)	RV5 364
	DO 1110 I=1,NP	1RV5 365
1110	WRITE (L2,1230) PSI(I),(ALFAC(J,I),J=3,NXF2)	1RV5 366
	WRITE (L2,1240) (XR(J),J=3,NXF2)	RV5 367
	DO 1120 I=1,NP	1RV5 368
1120	WRITE (L2,1230) PSI(I),(APACHC(J,I),J=3,NXF2)	1RV5 369
	IF(ICLK) 1130,1210,1130	RV5 370
1130	READ (L7) (TTPPT(I),TTPZ(I),TTT(I),TZPPT(I),TZPT(I),TZT(I),	RV5 371
1	TBPPT(I),TBPT(I),TBT(I),TTPPZ(I),TTPZ(I),TTZ(I),TZPPZ(I),TZPZ(I)	RV5 372
2	,TZZ(I),TPPPZ(I),TBPZ(I),TBZ(I),TTPPB(I),TTPB(I),TTPB(I),TZPPB(I)	RV5 373
3	,TZPB(I),TZB(I),TPPPB(I),TBPB(I),TBB(I),I=1,NP)	RV5 374
	DO 1170 I=1,NP	1RV5 375
	SACB=SB(I)*CB(I)	1RV5 376
	CASQ=CB(I)*CB(I)	1RV5 377
	SBSQ=SB(I)*SB(I)	1RV5 378
	CRMSB=CBSQ-SB&C	1RV5 379
	TH2=2.0*TH(I)	1RV5 380
	C2TH=COS(TH2)	1RV5 381
	SCTH=STH(I)*CTH(I)	1RV5 382
	STHSQ=STH(I)*STH(I)	1RV5 383
	CTHSQ=CTH(I)*CTH(I)	1RV5 384
	C1=S(I)	1RV5 385
	C2 = S(2)*CTH(I)	1RV5 386
	C3 = S(3)*CTH(I)	1RV5 387
	C24 = S(2)*STH(I)	1RV5 388
	C25 = S(3)*STH(I)	1RV5 389
	C42 = AI(2)*CTH(I)	1RV5 390
	C43 = AI(3)*CTH(I)	1RV5 391
	C44 = AI(2)*STH(I)	1RV5 392
	C45 = AI(3)*STH(I)	1RV5 393
	CA1=C22&C25	1RV5 394
	CA3=AI(5)*SCTH	1RV5 395
	CA4=C23-C24	1RV5 396
	CA6=C44-C43	1RV5 397
	CA10=C42&C45	1RV5 398
	CA11=AI(5)*CTHSQ	1RV5 399
	CA18=AI(5)*STHSQ	1RV5 400

ZD1=ZD(I)*1.0	1RV5 401
CAB1=C1*SB(I)-CA1*CB(I)	1RV5 402
CC3=-CA6*SB(I)-CA3*CB(I)	1RV5 403
CC5=CA1C*CB(I)&AI(4)*SB(I)	1RV5 404
CAFG=1.-CA1B	1RV5 405
CAEG1=CA10*SB(I)-CA1B*CB(I)	1RV5 406
THDSQ=THD(I)*THD(I)	1RV5 407
RDDSQ=BDD(I)*RBD(I)	1RV5 408
BDSQ =BC (I)*BC (I)	1RV5 409
ZDDSQ=ZDD(I)*ZCD(I)	1RV5 410
BDTHD=AD(I)*THD(I)	1RV5 411
ZD1BD=ZD1*BD(I)	1RV5 412
ZD1TD=ZD1*THD(I)	1RV5 413
TDDSQ=THDD(I)*THDD(I)	1RV5 414
ZD1SQ=ZD1*ZD1	1RV5 415
SUMM=0.0	1RV5 416
SUMT=0.0	1RV5 417
SUMZ=0.0	1RV5 418
XEND = 1.0 - X(NXF2)	1RV5 419
DO 1140 J = 2,NXF2	2RV5 420
XJ= X(J)-X(J-1)	2RV5 421
SUMT=SUMT&(DTDX(J,I)*XXI(J)&DTDX(J-1,I)*XXI(J-1))*XJ	2RV5 422
SUMZ=SUMZ&(DZDX(J,I)&DZDX(J-1,I))*XJ	2RV5 423
1140 SUMM=SUMM&(DMDX(J,I)&DMDX(J-1,I))*XJ	2RV5 424
SUMT=SUMT&DTDX(NXF2,I)*XXI(NXF2)*XEND	1RV5 425
SUMM=SUMM&DMDX(NXF2,I)*XEND	1RV5 426
SUMZ=SUMZ&DZDX(NXF2,I)*XEND	1RV5 427
GAMMA4=GAMMA2*0.5	1RV5 428
P2S=P2*SPSI(I)	1RV5 429
P2C=P2*CPSI(I)	1RV5 430
Q2S=Q2*SPSI(I)	1RV5 431
1150 Q2C=Q2*CPSI(I)	1RV5 432
FBI(I)=E1*CAB1*CC7(I)&(E21*CAB1&SBCB*CAFG-CA10*CBMSB)*ZD1SQ&2.0	1RV5 433
1*(CAEG1*ZD1TD&CA3*BDTHD)	1RV5 434
FBI(I)=FBI(I)&CA10*THDSQ-CC3*ZDD(I)&BDD(I)*(1.&CA1B)&CA6*THDD(I)	1RV5 435
FBI(I)=-FBI(I)&GAMMA4*SUMT&TTPB(I)*THDD(I)&TTPB(I)*THD(I)&TTB(I)	1RV5 436
1 *TH(I)&TZPPB(I)*ZDD(I)&TZB(I)*Z(I)&TRPPB(I)*RBD(I)&TBPR(I)*BC(I)	1RV5 437
2 *TBPR(I)*B(I)&TZPR(I)*ZD(I)-FCNSP*AKTB*THIN(I)&RSPRNG*BOA	1RV5 438
3-(1.&E2*S(1))*P2C&Q2S)*CPSI-AI(3)*(Q2C-P2S)	1RV5 439
FTI(I)=F1*(CA1*S7(I)-CA4*SB(I)*CZ(I))-E21*CA4*SB(I)-CA6*SBCB-CA3*	1RV5 440
1CRSQ)*ZD1SQ-2.*(CAEG1*ZC1BD&CA3*BDSQ)	1RV5 441
FTI(I)=FTI(I)&CA6*RDD(I)&(E21*CA1&CC5)*ZDD(I)&AI(4)*THDD(I)	1RV5 442
FTI(I)=-FTI(I)&GAMMA4*SUMT&TTPPT(I)*THDD(I)&TTT(I)*TH(I)	1RV5 443
1 *TZPPT(I)*ZDD(I)&TZT(I)*Z(I)&TRPPT(I)*RDD(I)&TRPT(I)*RD(I)	1RV5 444
2 *TRPT(I)*R(I)&TZPT(I)*ZD(I)&FCNSP*THIN(I)&RSPRNG*TOA	1RV5 445
3-(AI(3)&E2*S(3))*(Q2S&P2C) -AI(5)*Q2C-P2S	1RV5 446
1160 FZ1(I)=F1*(SZ(I)*(E21*AM&C1*CB(I)&CA1*SB(I))-CA4*CZ(I)	1RV5 447
FZ1(I)=FZ1(I)&2.*(E21*(-C1*SB(I)&CA1*CB(I))-CAEG1*SBCB-CA10*CBMSB	1RV5 448
1)*ZD1BD&(E21*CA4*SB(I)-CA6*SBCB-CA3*CBMS)*ZD1TD	1RV5 449
FZ1(I)=FZ1(I)&2.*CA11*CE(I)*BDTHD&(CA6*CB(I)-CA3*SB(I))*RDSQ&(E21	1RV5 450

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1*CA4-CA6*CB(I)*THDSQ                                IRV5 451
FZ1(I)=FZ1(I)-CC3*BDD(I)&(F21*CA1&CC5)*THDD(I)E      IRV5 452
1 (F21*(F21*AM&2.0*(C1*CB(I)&CA1*SB(I)))&CBSQ&CA10*SB&CB IRV5 453
2&AI(5)*(CTHSQ&STHSQ*SB&SC))*ZDD(I)                IRV5 454
1170 FZ1(I)=-FZ1(I)&GAMMA4*SUMZ&TTPZ(I)*THDD(I)&TTPZ(I)*THD(I)&TTZ(I)*IRV5 455
1 TH(I)&TZPPZ(I)*ZDD(I)&TZ(I)*Z(I)&TBPPZ(I)*BDD(I)&TBZ(I)*BD(I) RV5 456
2 &TBZ(I)*B(I)&TZPZ(I)*ZC(I)-FCNSP*AKTZ*THIN(I)&ZSPRNG*ZOA RV5 457
1180 DO 1190 I=1,NP                                    IRV5 458
FT(I)=(FT1(I)&FT(I))/2.C                               IRV5 459
FB(I)=(FB1(I)&FB(I))/2.C                               IRV5 460
1190 FZ(I)=(FZ1(I)&FZ(I))/2.C                           IRV5 461
REWIND L7                                              RV5 462
DO 1200 NTMS = 1,7                                     IRV5 463
1200 READ (L7)                                         IRV5 464
GO TO 250                                             RV5 465
1210 REWIND L3                                         RV5 466
READ (L3)                                             RV5 467
READ (L3)                                             RV5 468
WRITE(L3)X1,FCPC,FCHO,EL,CONST,E2,S(I),AI(I),       RV5 469
1R,(X(I),XXI(I),DMB(I),I=1,NXF2),(CB(I),SB(I),CPSI(I),BDD(I),CZ(I), RV5 470
2 SPSI(I),BD(I),I=1,NP),((DPDXP(J,I),DPDXI(J,I),DTDX(J,I),DMDX(J,I) RV5 471
3 ,J=1,NXF2),I=1,NP),CCCONST,ACONST,BFLN,ALFAR,OMSQ,NCASE,AM,   RV5 472
4 LSS1,((ALFAC(J,I),J=1,NXF2),I=1,NP),(PSI(I),I=1,NP),XE21,XO,   RV5 473
5 (R(I),TH(I),Z(I),I=1,NP),INTAN,NHARR,NOHAR,IRATE,LFAR,XEND,NM,   RV5 474
6 BEQ,KFQ,AMINF,TIN,UR,GAMM,RHC,OMEGAR,E21,E1,AIS,BIS,FDAMP,AKTZ,   RV5 475
7 DREF,XREF,ALL,ALH,DELAL,ZDC,THIN,AKTR,BOA,FCNSP,BDAMP,BSPRNG   RV5 476
8 ,FSPRNG,TOA,THC,((VLL(J,I),J=1,NXF2),I=1,NP)           RV5 477
REWIND L3                                             RV5 478
REWIND L6                                             RV5 479
1220 FORMAT(11H1,30X,34HBLADE ANGLE OF ATTACK DISTRIBUTION/43X,11HRADIAL RV5 480
1 SYA./7H PSI,12F10.3//)                               RV5 481
1230 FORMAT(F7.1,12F10.3//)                             RV5 482
1240 FORMAT(29X,26HPACH NUMBER DISTRIBUTION,12X/43X,11HRADIAL STA./ RV5 483
17H PSI,12F10.3//)                                     RV5 484
1250 FORMAT(11H CP FACTOR=F8.4,9X,11H CH FACTOR=F8.4//) RV5 485
1260 FORMAT(//////////19H ELADE PARAMETERS//5H R=F8.2,10H FT. E= RV5 486
1F8.4,11H FT. I1=F10.5,11HSLUG-FT.SQ.,5X,10HNO BLADES=F4.0////////) RV5 487
1270 FORMAT(/5X,5HCONDITION/6H MU =F7.4,5X,15HLAMBDA(STEADY)=F8.4/10X, RV5 488
116HTHETA 0(STEADY)=F6.2,9X,13HTHETA 1(COS)=F6.2,5X,13HTHETA 1(SIN) RV5 489
2=F6.2 //)                                             RV5 490
1280 FORMAT(/53H BETA GREATER THAN 90 DEGREES CONDITION DISCONTINUED/) RV5 491
1290 FORMAT(20X33HLAST ITERATION **NOT CONVERGED**/)   RV5 492
1300 FORMAT(17HITERATION CCLAT=12)                     RV5 493
1310 FORMAT(12H AZIMUTH STA,4X,4HBETA,5X,5HTHETA,5X,9HAG ANGLE//(F9.) RV5 494
1,F12.4,F9.4,F12.4))                                   RV5 495
1320 RETURN                                             RV5 496
END                                                    RV5 497

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C	SUBROUTINE INTLIN (AMACSL,ALFASL,DELTSL,PAR,N,K,L,PARFNL)	INL	1
C	THIS SUBROUTINE IS CATALOGED IN THE RELOCATABLE LIARARY AS SUB0501	INL	2
C		INL	3
C	LINEAR INTERPOLATION FOR FUACTION OF UP TO THREE VARIABLES	INL	4
C		INL	5
C	DIMENSION PAR(48, 8,6)	INL	6
C		INL	7
C		INL	8
	J=L-1	INL	9
	PAR1=PAR(N-1,K-1,J)EALFASL*(PAR(N,K-1,J)-PAR(N-1,K-1,J))	INL	10
	PAR2=PAR(N-1,K ,J)EALFASL*(PAR(N,K ,J)-PAR(N-1,K ,J))	INL	11
	PAR3=PAR1EAMACSL*(PAR2-PAR1)	INL	12
	PARFNL=PAR3	INL	13
	IF (DELTSL) 100,110,100	INL	14
100	PAR4 = PAR(N-1,K-1,L)EALFASL*(PAR(N,K-1,L)-PAR(N-1,K-1,L))	INL	15
	PAR5 = PAR(N-1,K,L)EALFASL*(PAR(N,K,L)-PAR(N-1,K,L))	INL	16
	PAR6 = PAR4 E AMACSL * (PAR5-PAR4)	INL	17
	PARFNL = PAR3 E DELTSL * (PAR6-PAR3)	INL	18
110	RETURN	INL	19
	END	INL	20

SUBROUTINE AERCAT(DMY)  
RETURN  
END

AER 1  
AER 2  
AER 3

	SUBROUTINE RVSPC6	RV6	1
		RV6	2
C		RV6	3
C		RV6	4
C		RV6	5
	DIMENSION	RV6	6
	1S(3),AI(5),X(12),XXI(12),CBA(24),SBA(24),RDD(24),SPSI(24),CPSI(24)	RV6	7
	2,DPDXP(12,24),DPDXI(12,24),DTDX(12,24),DPDSII(24),DPOSIP(24),	RV6	8
	3DQDSI(24),DQDSIP(24),CTCPSI(24),DYMP(24),OM(4),CO(4),XJ2(12),	RV6	9
	4DQDPSI(24),DQDPSI(24),CCEF(3,4),ABC(3),DMDX(12,24),DOUTDR(12,24),	RV6	10
	5DINDR(12,24),XB(12),XB1(12),DMB(12),BD(24),ZDD(24),	RV6	11
	6HEAD(17),PSI(24),ALFAC(12,24),B(24),TH(24),Z(24),C(12),ALAM(12,24)	RV6	12
	7,RHOC(12,24),AMUC(12,24),RC(24),CZ(24),DXMPSI(24),THIN(24),THD(24)	RV6	13
C		RV6	14
C		RV6	15
	COMMON L1,L2,L3,L4,L5,L6,L7,L8,NCHK,ALAM,X,PSI,ALFAC,NX,NP,DOUTDR,	RV6	16
	1DINDR,NCPBNC,RHO,OMRSQ,P,TH,Z,INTAN,ITERB,EBC,EBD,ETC,ETD,	RV6	17
	2FXC,FZC,ALFAR,POS,AIS,BIS,THRUST,HFORCE,HP,YFORCE,CT,CH,CP,CY,BD,	RV6	18
	3CPSI,SPSI,XO,ALL,ALH,DELAL,NHARB,C,OMEGA,R,DMDX,HEAD,NOHAR,E2,	RV6	19
	4AMUC,BEQ,REQ,AMINF,TIN,UR,GAMM,NXF2,OMEGAR,ALAMO,	RV6	20
	SRC,XREF,DREF,RHOC,DPSI,AMU,YMOM,XMOM,XFT(12),CN,SN,VLL(12,24)	RV6	21
C		RV6	22
	REWIND L6	RV6	23
	REWIND L8	RV6	24
	READ (L6) ACS,NC1,NIOM,IKCM,KOM,COTOL,NCHK,(CO(I),OM(I),I=1,3)	RV6	25
	1,ALAMO,IDYN	RV6	26
	IF(IDYN) 110,100,110	RV6	27
100	READ (L8) AMUFS,ALAMFS,AMOCK,ITEST	RV6	28
	GO TO 120	RV6	29
110	READ (L8)	RV6	30
	READ (L8) AMUFS,ALAMFS,AMOCK,ITEST	RV6	31
120	REWIND L3	RV6	32
	READ (L3) LCCN,NXF2,NP,((ALAM(J,I),AMUC(J,I),RHOC(J,I),J=1,NXF2),	RV6	33
	1 I=1,NP)	RV6	34
	READ (L3) KTCR,Q2,P2,OMEGA,ALAMO,AMU,TOROSV,ALFAR	RV6	35
	READ (L3)X1,FCPO,FCHO,BL,CONST,E2,S(1),AI(1),R,(X(1),	RV6	36
	1XXI(1),DMB(1),I=1,NXF2),(CBA(1),SBA(1),CPSI(1),RDD(1),CZ(1),	RV6	37
	2 SPSI(1),BD(1),I=1,NP),((DPDXP(J,I),DPDXI(J,I),DTDX(J,I),DMDX(J,I)	RV6	38
	3 ,J=1,NXF2),I=1,NP),CCNST,ACNST,BFLN,DMY ,OMSQ,NCASE,AM,	RV6	39
	4 LSS1,((ALFAC(J,I),J=1,NXF2),I=1,NP),(PSI(1),I=1,NP),XE21,XJ,	RV6	40
	5 (R(1),TH(1),Z(1),I=1,NP),INTAN,NHARB,NOHAR,IRATE,LFAR,XEND,NM,	RV6	41
	6 BEQ,REQ,AMINF,TIN,UR,GAMM,RHC,OMEGAR,E21,E1,AIS,BIS,FDAMP,AKTZ,	RV6	42
	7 DREF,XREF,ALL,ALH,DELAL,ZDC,THIN,AKTR,ROA,FCNSP,ADAMP,BSPRNG	RV6	43
	8,FSPRNG,TOA,THC,((VLL(J,I),J=1,NXF2),I=1,NP)	RV6	44
	OMEGAR = OMEGA * R	RV6	45
	NX = NXF2	RV6	46
	SUMTO=0.0	RV6	47
	SUMTH=0.0	RV6	48
	XEND = XEND * .5	RV6	49
	HCONST = ACONST*R	RV6	50

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CON7 = CCNST * PHO
DO 140 I=1,NP
SUMQI=0.0
SUMQP=0.0
SUMT=0.0
DO 130 J=2,NXF2
XFT(J) = X(J) * R
XCRA = X1*CZ(I)*XE2I
XJ2(J)=0.5*(X(J)-X(J-1))
XB(J)=XCBA&XXI(J)*CBA(I)
XB1(J)=XCBA&XXI(J-1)*CBA(I)
SUMT=SUMT&XJ2(J)*(DTDX(J,I)&DTDX(J-1,I))*CBA(I)
SUMQP=SUMQP&XJ2(J)*(DPDXP(J,I)*XB(J)&DPDXP(J-1,I)*XB1(J))*R
130 SUMQI=SUMQI&XJ2(J)*(DPDXI(J,I)*XB(J)&DPDXI(J-1,I)*XB1(J))*R
DTDPSI(I)=SUMT&DTDX(NXF2,I)*XE*D*CBA(I)
SUMT0=SUMQI&SUMQP*FCPO&SUMTC&DPDXI(NXF2,I)&DPDXP(NXF2,I))*
IXEND*XB(NXF2)*R
140 SUMTH = SUMTH & DTDPSI(I)
TORQUE=SUMT0*CCCNST
DQ = TORQUE - TORQSV
TORQSV = TORQUE
CP=TORQUE/(CONZ *R)
THRUST=SUMT/*CCCNST
CT=THRUST/CONZ
IF (NTOR) 530,150,530
150 CM(KOM)=AOS
CQ(KOM) = TORQUE
IF(ABS(CQ(KOM))-CQTOLI) 160,160,180
160 WRITE (L2,170)
170 FORMAT (1H1./,19H TORQUE EQUILIBRIUM )
GO TO 410
180 IF(IKOM-NIOM) 210,210,190
190 WRITE(L2,200)
200 FORMAT(10X,34H MAXIMUM ITERATIONS ON CQ EXCEEDED///)
CALL EXIT
210 GO TO (220,320,330), KOM
220 IF(ALAMC) 240,230,240
230 AOS1=AOS
AOS=.6667*AOS
GO TO 310
240 DCQDD=-ALAMC*ACCNST*RHC*BL*P*R*4./57.2958*.08333333
AOS1=AOS
DAOS=-TORQUE/DCQDD
IF(ALAMC) 260,210,250
250 DAOS=-DAOS
260 IF(ABS(DAOS)-5.) 300,300,270
270 IF(DAOS) 280,300,290
280 DAOS=-5.0
GO TO 300
290 DAOS=5.
RV6 51
1RV6 52
1RV6 53
1RV6 54
1RV6 55
2RV6 56
2RV6 57
2RV6 58
2RV6 59
2RV6 60
2RV6 61
2RV6 62
2RV6 63
2RV6 64
1RV6 65
1RV6 66
1RV6 67
1RV6 68
RV6 69
RV6 70
RV6 71
RV6 72
RV6 73
RV6 74
RV6 75
RV6 76
RV6 77
RV6 78
RV6 79
PV6 80
RV6 81
RV6 82
RV6 83
RV6 84
RV6 85
RV6 86
RV6 87
PV6 88
RV6 89
PV6 90
RV6 91
RV6 92
RV6 93
RV6 94
RV6 95
RV6 96
RV6 97
RV6 98
RV6 99
RV6 100

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300 AOS=AOS&DAOS	RV6 101
310 KCM = 2	RV6 102
GO TO 650	RV6 103
320 KOM1 = KCM-1	RV6 104
AOS1=AOS	RV6 105
AOS=OM(KOM)-CQ(KOM)*(OM(KCM1)-CM(KOM))/(CQ(KOM1)-CQ(KOM))	RV6 106
KOM = 3	RV6 107
GO TO 650	PV6 108
330 DO 340 I1 = 1,3	1RV6 109
COEF(I1,1) = OM(I1)*OM(I1)	1RV6 110
COEF(I1,2) = OM(I1)	1RV6 111
340 COEF(I1,3) = 1.0	1RV6 112
CALL INVRS (COEF,3)	RV6 113
DO 360 L = 1,3	1RV6 114
SUM = 0.	1RV6 115
DO 350 K = 1,3	2RV6 116
SUM = COEF(L,K)*CQ(K)&SUM	2RV6 117
360 ABC(L) = SUM	1RV6 118
DO 370 I1 = 2,3	1RV6 119
OM(I1-1) = OM(I1)	1RV6 120
370 CQ(I1-1) = CQ(I1)	1RV6 121
AOS1=AOS	RV6 122
RADCL=ABC(2)**2-4.*ABC(1)*ABC(3)	RV6 123
IF(RADCL) 390,380,380	RV6 124
380 AOS=(-ABC(2)&SQRT(RADCL))/(2.*ABC(1))	RV6 125
AOS=(AOS&AOS1)/2.	RV6 126
GO TO 650	RV6 127
390 WRITE (L2,400)	RV6 128
400 FORMAT(46H NO CONVERGENCE INFLOW RATIO MUST BE ALTERED ///)	RV6 129
CALL EXIT	RV6 130
410 NCHK = 0	RV6 131
GO TO (420,430,440), LFAR	RV6 132
420 ALFAR=0.0	RV6 133
GO TO 470	RV6 134
430 ALFAR = 1.5708	RV6 135
GO TO 470	RV6 136
440 IF(NMOCK-1) 450,460,450	RV6 137
450 ALFAR=ATAN(ALAMO/AMU&0.5*CT/(AMU*SQRT(ALAMO*ALAMO&AMU*AMU)))	RV6 138
GO TO 470	RV6 139
460 ALFAR=ATAN(ALAMFS/AMUFS)	RV6 140
470 IF (LCON) 520,480,520	RV6 141
480 WRITE (L2,490)	RV6 142
490 FORMAT ( 66H CAPSULE BOW WAVE-VECTOR DISK INTERSECTION HAS NOT BEEN	RV6 143
1 CALCULATED /)	PV6 144
WRITE (L2,500) AOS,THRUST,TCRQUE	RV6 145
500 FORMAT (5X,19HBLADE PITCH(TH75) = ,F10.3,10H THRUST = ,F10.3,	RV6 146
1 10H TCRQUE = ,F10.3)	RV6 147
CALL INFLOW	RV6 148
LCON = 1	RV6 149
KOM=1	RV6 150

	IKOM=1	RV6 151
	DO 510 I=1,3	RV6 152
	OM(I)=0.	RV6 153
510	CQ(I)=0.	RV6 154
	GO TO 670	RV6 155
520	NTOR = 1	RV6 156
530	SUMHF=0.0	RV6 157
	SUMYF=0.0	RV6 158
	SUMY4=0.0	RV6 159
	SUMXM = 0.0	RV6 160
	FCTB = FCNSP * AKTB	RV6 161
	DO 550 I=1,NP	RV6 162
	PZ = (PSI(I)/57.2958)-Z(I)	RV6 163
	CPZ = COS(PZ)	RV6 164
	SPZ = SIN(PZ)	RV6 165
	SUMPI=0.0	RV6 166
	SUMPP=0.0	RV6 167
	DO 540 J=2,NXF2	RV6 168
	SUMPI=SUMPI&XJ2(J)*(DPDXI(J,I)&DPDXI(J-1,I))	2RV6 169
540	SUMPP=SUMPP&XJ2(J)*(DPDXP(J,I) &DPDXP(J-1,I) )	2RV6 170
	DPDSII(I)=SUMPI&DPDXI(NXF2,I)*XEND	RV6 171
	DPDSIP(I)=SUMPP&DPDXP(NXF2,I)*XEND	RV6 172
	YMF = DTDPPI(I)*BCCNST-S(I)*QMSQ*(BDDII)&Q2*SPSI(I)&P2*CPSI(I)	RV6 173
	1CBA(I)*AI(I)	RV6 174
	YMMB=(-BDAMP*BE(I)-BSPRNG*(P(I)-POA)-FCTR*(AKTB*B(I)&THINI(I)-TH(I))	RV6 175
	1&AKTZ*Z(I))*AI(I)*CMSQ	RV6 176
	YMMT=(-FDAMP*THD(I)-FSFRNG*(TH(I)-TOA)&FCNSP*(THINI(I)-TH(I)&AKTB*	RV6 177
	1B(I)&AKTZ*Z(I))*AI(I)*CMSQ	RV6 178
	DYMPPI(I) = -YMF*(E21*CFZ&CPSI(I)*E1)-YMMB*CPZ&YMMT*SPZ	RV6 179
	DXMPPI(I) = YMF*(E21*SFZ&SPSI(I)*E1)&YMMB*SPZ&YMMT*CPZ	RV6 180
	DPDPSI(I)=DPSII(I)&DPDPSIP(I)	RV6 181
	SUMYM=SUMYM&DYMPPI(I)	RV6 182
	SUMXM = SUMXM & DXMPPI(I)	RV6 183
	SUMHF=(DPDSII(I)&DPDSIP(I)*FCHO)*SPSI(I)-DTDPSI(I)*SBA(I)*CPSI(I)/	RV6 184
	1CBA(I)&SUMHF	RV6 185
550	SUMYF=-DPDPSI(I)*CPSI(I)-DTDPSI(I)*SBA(I)*SPSI(I)/CBA(I)&SUMYF	RV6 186
	YFORCE=SUMYF*CCNST	RV6 187
	HFORCE=SLMHF*CCNST	RV6 188
	YMM = SLYM*BFLN	RV6 189
	XMM = SUMXM*BFLN	RV6 190
560	HP=TORQLF*CMGA/550.0	RV6 191
	CY=YFORCE/CENZ	RV6 192
	CH=HFORCE/CENZ	RV6 193
	IF(ALFAR-1.5708) 580,570,580	RV6 194
570	SALFAR=1.	RV6 195
	CALFAR=C.	RV6 196
	GO TO 590	RV6 197
580	SALFAP=SIN(ALFAR)	RV6 198
	CALFAP=COS(ALFAP)	RV6 199
590	FZC=THRLST*CALFAR-HFORCE*SALFAR	RV6 200

FXC=&HFCRCE*CALFAR&THRUST*SALFAR	RV6 201
600 DO 670 I=1,NP	IRV6 203
DO 620 J=3,NXF2	2RV6 204
DMDX(J,I)=DMDX(J,I)*ACCAST*R	2RV6 205
DOUTDR(J,I)=DYDX(J,I)*ACCNST*CBA(I)	2RV6 206
610 DINDR(J,I)=-((DPDXP(J,I)&DPCXI(J,I))*ACONST-OMSQ*R*XXI(J)*SBA(I)	2RV6 207
L*RD(I)*DMB(J)*0.062189*12.)	2RV6 208
620 CONTINUE	2RV6 209
630 WRITE (L2,640) NCASE	RV6 210
CALL OUT2(DMY,LSS1)	RV6 211
LCON = C	RV6 212
GO TO 670	RV6 213
640 FORMAT (15H1 CASE NO= I3///)	RV6 214
650 WRITE (L2,660) IKOM,AOS,AOS1,THRUST,TORQUE	RV6 215
REWIND L3	RV6 216
660 FORMAT (//20H ITER COUNT CN TH75= I2,5X,10H NEW TH75= F6.1,5X,	RV6 217
19HOLD TH75= F6.1,5X,7HTHRUST= F10.1,5X,7HTORQUE= F10.1/////)	RV6 218
NCHK = 1	RV6 219
IKOM = IKOM & 1	RV6 220
GO TO 680	RV6 221
670 REWIND L3	RV6 222
WRITE(L3) LCCN,NXF2,NP,((ALAM(J,I),AMUC(J,I),RHOC(J,I),J=1,NXF2),	RV6 223
1 I=1,NP)	RV6 224
WRITE(L3) NTCR,Q2,P2,CMEGA,ALAMO,AMU,TOROSV,ALFAD	RV6 225
680 REWIND L6	RV6 226
WRITE(L6) AOS,NC1,NICP,IKOM,KCP,COTOL,NCHK,(CQ(I),DM(I),I=1,3)	RV6 227
1,ALAMO,IDYN	RV6 228
IF (NTOR) &SC,E10,690	RV6 229
690 CALL FOROUT (DMY)	RV6 230
IF(IDYN) 720,700,720	RV6 231
700 WRITE (L2,710)	RV6 232
710 FORMAT (////20X,11HEND OF CASE/20X,26HTIME HISTORY NOT REQUESTED)	RV6 233
CALL EXIT	RV6 234
720 WRITE (L3) TORQUE,HFORCE,YFCRCE,THRUST,YMOM,XMOM,CT	RV6 235
GO TO (730,810), ITEST	RV6 236
730 IF (CALFAR) 780,740,780	RV6 237
740 IF(NMOCK-1) 750,760,750	RV6 238
750 W=OMEGAR*(ALAMFS&.5*CT/ALAMFS)	RV6 239
GO TO 770	RV6 240
760 W=OMEGAR*ALAMFS	RV6 241
770 VFREF = W	RV6 242
GO TO 790	RV6 243
780 VFREF = AMLFS * CMEGAR / CALFAR	RV6 244
W=VFREF*SALFAR	RV6 245
790 REWIND L8	RV6 246
DO 800 J=1,4	IRV6 247
800 READ (LF)	IRV6 248
WRITE (L8) VFRFE,W,ALFAR,AMUFS,ALAMFS	RV6 249
810 RETURN	RV6 250
END	RV6 251

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SUBROUTINE FORCUT(DMY)
DIMENSION PSI(24),CPSI(24),SPSI(24),R(24),TH(24),Z(24),
1  ALFAC(12,24),DOUDR(12,24),DINDR(12,24),X(12),C(12),BD(24),
2  DMGX(12,24),HEAD(17),ALAF(12,24),AMUC(12,24),RHOC(12,24)
DIMENSION RC(24)
COMMON L1,L2,L3,L4,L5,L6,L7,L8,NCHK,ALAM,X,PSI,ALFAC,NX,NP,DOUDR,
DINDR,NCPBMC,RHQ,OMRSQ,B,TH,Z,INTAN,ITERR,EBC,FBD,ETC,ETO,
2FXC,FZC,ALFAR,AOS,AIS,BIS,THRUST,HFORCE,HP,YFORCE,CT,CH,CP,CY,ED,
3CPSI,SPSI,XO,ALL,ALH,DELAL,MMARB,C,OMEGA,P,DMGX,FEAD,NOMAR,F2,
4AMUC,BEG,REQ,APINF,TIN,UR,GAMM,NXF2,OMEGAR,ALAMO,
5KC,XREF,DREF,RHCC,DPSI,AMU,YMOM,XMOM,XFT(12),CN,SN
ALFAR1 = ALFAR * 57.2958
100 WRITE (L2,120) FXC,FZC,ALFAR1
WRITE (L2,140) AOS,AIS,BIS
WRITE (L2,130) THRUST,HFORCE,HP,YFORCE,CT,CH,CP,CY
WRITE(L2,110) YMOM,XMOM
110 FORMAT (24H MOMENT ABOUT Y AXIS =F10.2,6H FT LB /
1 24H MOMENT ABOUT X AXIS =F10.2,6H FT LB///// )
120 FORMAT( 31H (FORCE ALONG FLIGHT PATH)CALC=F7.0,36H (FORCE NORMAL
1TO FLIGHT PATH)CALC=F7.0,3X, 6HALFAR=F7.2,5H(DEG)/
2)
130 FORMAT(8H THRUST=F8.1,13X,7HHFORCE=F8.1/5X,3HHP=F8.1,13X,7HYFORCE=
1F8.1/5X3HCT=F8.5,17X,3HCH=F8.5/5X3HCP=(F8.5,17X,3HCY=F8.5///)
140 FORMAT(1X,13HCONTROL INPUT/3X,16HFEATHERING (DEG)/7X,13HSTEADY
1 =F7.3/7X,12HCYCLIC(COS)=F7.3/7X,12HCYCLIC(SIN)=F7.3///)
150 RETURN
END
FOT 1
FOT 2
FOT 3
FOT 4
FOT 5
FOT 6
FOT 7
FOT 8
FOT 9
FOT 10
FOT 11
FOT 12
FOT 13
FOT 14
FOT 15
FOT 16
FOT 17
FOT 18
FOT 19
FOT 20
FOT 21
FOT 22
FOT 23
FOT 24
FOT 25
FOT 26
FOT 27

```

	SUBROUTINE HANAL(K,N,NCHAR,F,CPSI,SPSI,X,LSSI)	HRL	1
C	K = NUMBER OF RADIAL STATIONS	HRL	2
C	N = NUMBER OF ORDINATES (AZIMUTH STATIONS)	HRL	3
C	F = TWO-ARRAY FUNCTION (N,K) TO BE HARMONICALLY ANALYZED AT EACH	HRL	4
C	DIMENSIONLESS RADIAL STATION X	HRL	5
C	X = SINGLE ARRAY DEFINING EACH DIMENSIONLESS RADIAL STATION	HRL	6
C	CPSI = SINGLE ARRAY DEFINING COSINE OF ANGLE AT EACH ORDINATE	HRL	7
C	SPSI = SINGLE ARRAY DEFINING SINE OF ANGLE AT EACH ORDINATE	HRL	8
C	DIMENSION F(12,24),CPSI(24),SPSI(24),X(12)	HRL	9
	COMMON L1,L2,L3,L4,L5,L6,L7,L8,NCHK	HRL	10
	AN=N	HRL	11
100	DO 180 J=3,K	HRL	12
	WRITE (L2,190) X(J)	HRL	13
	DO 170 NC=1,NCHAR	HRL	14
	SUMSN=0.0	HRL	15
	SUMCN=0.0	HRL	16
	SUMAQ=0.0	HRL	17
	DO 140 I=1,N	HRL	18
	NOF=NO*(I-1)&1	HRL	19
110	IF(NOE-N) 130,130,120	HRL	20
120	NOE=(NOE-N)	HRL	21
	GO TO 110	HRL	22
130	SNOPSI=SPSI(NOE)	HRL	23
	CNOPSI=CPSI(NOE)	HRL	24
	SUMCN=SUMCN&F(J,I)*CNOPSI	HRL	25
	SUMSN=SUMSN&F(J,I)*SNOPSI	HRL	26
140	SUMAQ=SUMAQ&F(J,I)	HRL	27
	IF(NOE-1) 150,150,160	HRL	28
150	AQ=SUMAQ/AN	HRL	29
160	CN=2.0*SUMCN/AN	HRL	30
	SN=2.0*SUMSN/AN	HRL	31
170	WRITE (L2,200) AQ,CN,SN	HRL	32
180	WRITE (L2,210) AQ	HRL	33
	RETURN	HRL	34
C		HRL	35
190	FORMAT(24X,16#RADIAL STATION =F6.3/10X,18#HARMONIC COMPONENT,16X,	HRL	36
	16#COSINE,16X,4#SINE)	HRL	37
200	FORMAT(10X,110,F32.6,F20.6)	HRL	38
210	FORMAT(10X,17#STEADY COMPONENT=F15.6///)	HRL	39
	END	HRL	40

	SUBROUTINE HRA1AR(NBTH)	HR1	1
C	THIS SUBROUTINE, HRA1AR, HARMONICALLY ANALYZES THE ONE-ARRAY	HR1	2
C	FUNCTION DENOTED BY B, FOR THE NUMBER OF HARMONICS DENOTED BY	HR1	3
C	NOHAR.	HR1	4
C	NP= NUMBER OF COORDINATES	HR1	5
C	FLOATN = FLOATING NUMBER CORRESPONDING TO N	HR1	6
C	CPSI = SINGLE ARRAY DEFINING COSINE OF ANGLE AT EACH ORDINATE	HR1	7
C	SPSI = SINGLE ARRAY DEFINING SINE OF ANGLE AT EACH ORDINATE	HR1	8
	DIMENSION PSI(24),CPSI(24),SPSI(24),B(24),TH(24),Z(24),	HR1	9
	1 ALFAC(12,24),COUTDR(12,24),DINDR(12,24),X(12),C(12),BD(24),	HR1	10
	2 DMGX(12,24),HEAD(17),ALAM(12,24),AMUC(12,24),RHOC(12,24)	HR1	11
	DIMENSION RC(24),V(24)	HR1	12
	COMMON L1,L2,L3,L4,L5,L6,L7,L8,NCHK,ALAM,X,PSI,ALFAC,NX,NP,DOUTDR,	HR1	13
	1DINDR,NCPBMC,RHO,OMRSD,P,TH,Z,INTAN,ITERB,EBC,EBD,ETC,ETD,	HR1	14
	2FXC,FZC,ALFAR,AOS,AIS,BIS,THRUST,HFORCE,HP,YFORCE,CT,CH,CP,CY,ED,	HR1	15
	3CPSI,SPSI,NO,ALL,ACH,DELAL,NHARR,C,OMEGA,R,DMGX,HEAD,NOHAR,EZ,	HR1	16
	4AMUC,BEQ,REC,APINE,TIN,UR,GAMM,NXF2,OMEGAR,ALAMO,	HR1	17
	5RC,XREF,DREF,RHCC,DPSI,AMU,YMOM,XMOM,XFT(12),CN,SN	HR1	18
	GO TO (100,120),NBTH	HR1	19
100	DO 110 I = 1, NP	1HR1	20
110	V(I) = B(I)	1HR1	21
	GO TO 140	HR1	22
120	DO 130 I = 1, NP	1HR1	23
130	V(I) = TH(I)	1HR1	24
140	ANP=NP	HR1	25
	DO 210 NO=1,NOHAR	1HR1	26
	SUMSN=0.0	1HR1	27
	SUMCN=0.0	1HR1	28
	SUMAO=0.0	1HR1	29
	DO 180 I=1, NP	2HR1	30
	NOE=NO*(I-1)+1	2HR1	31
150	IF(NOE-NP) 170,170,160	2HR1	32
160	NOE=(NOE-NP)	2HR1	33
	GO TO 150	2HR1	34
170	SNOPSI=SPSI(NOE)	2HR1	35
	CNOPSI=CPSI(NOE)	2HR1	36
	SUMCN=SUMCN+V(I)*CNOPSI	2HR1	37
	SUMSN=SUMSN+V(I)*SNOPSI	2HR1	38
180	SUMAO=SUMAO+V(I)	2HR1	39
190	AO=SUMAO/ANP	1HR1	40
200	CN=-2.0*SUMCN/ANP	1HR1	41
	SN=-2.0*SUMSN/ANP	1HR1	42
210	WRITE (L2,220) NO,CN,SN	1HR1	43
	WRITE (L2,230) AO	HR1	44
220	FORMAT(10X,110,F32.6,F20.6/)	HR1	45
230	FORMAT(20X,18H STEADY COMPONENT=F15.6///)	HR1	46
240	RETURN	HR1	47
	END	HR1	48

	SUBROUTINE INTANG(DMY)	ING	1
		ING	2
	DIMENSION PSI(24), CPSI(24), SPSI(24), B(24), TH(24), Z(24),	ING	3
1	ALFAC(12,24), COUTOR(12,24), DINDR(12,24), X(12), C(12), BD(24),	ING	4
2	DMDX(12,24), HEAD(17), ALAM(12,24), AMUC(12,24), RHOC(12,24)	ING	5
	DIMENSION RC(24)	ING	6
	COMMON L1,L2,L3,L4,L5,L6,L7,L8,NCHK,ALAM,X,PSI,ALFAC,NX,NP,DOUTOR,	ING	7
	DINDR,NGPBMC,RHO,DMRSQ,E,TH,Z,INTAN,ITERB,EBC,EBD,ETC,ETD,	ING	8
	ZFXC,FZC,ALFAR,AOS,AIS,EIS,THRUST,HFORCE,HP,YFORCE,CT,CH,CP,CY,BD,	ING	9
	3CPSI,SPSI,XO,ALL,ALH,DELAL,NHARB,C,OMEGA,R,DMDX,HEAD,NOHAR,E2,	ING	10
	4AMUC,BEC,REG,APINF,TIN,UR,GAMM,NXF2,OMEGAR,ALAMO,	ING	11
	5RC,XRFF,DREF,RHOC,OPSI,AMU,YMOP,XMOM,XFT(12),CN,SN	ING	12
	WRITE (L2,100)	ING	13
100	FORMAT (50H) ANGLE OF ATTACK DATA AT EACH AZIMUTH POSITION///)	ING	14
	DO 340 I=1,NP	ING	15
	WRITE (L2,110) PSI(I)	ING	16
110	FORMAT (11H AZIMUTH = F5.1 )	ING	17
	AMIN=ALFAC(3,I)	ING	18
	AMAX=AMIN	ING	19
	XMIN=X(3)	ING	20
	XMAX=XMIN	ING	21
	DO 150 J=4,NX	ING	22
	IF(AMIN-ALFAC(J,I)) 120,120,130	ING	23
120	IF(AMAX-ALFAC(J,I)) 140,140,150	ING	24
130	AMIN=ALFAC(J,I)	ING	25
	XMIN=X(J)	ING	26
	GO TO 150	ING	27
140	AMAX=ALFAC(J,I)	ING	28
	XMAX=X(J)	ING	29
150	CONTINUE	ING	30
	ALTIP=(ALFAC(NX,I)-ALFAC(NX-1,I))*(1.0-X(NX))/(X(NX)-X(NX-1))	ING	31
	ALX0=ALFAC(NX,I)	ING	32
	ALX0=ALFAC(3,I)-(ALFAC(4,I)-ALFAC(3,I))*(X(3)-X0)/(X(4)-X(3))	ING	33
	IF(ALTIP-ALX0) 160,160,200	ING	34
160	IF(ALTIP-AMIN) 170,180,180	ING	35
170	AMIN=ALTIP	ING	36
	XMIN=1.0	ING	37
180	IF(ALX0-AMAX) 240,240,190	ING	38
190	AMAX=ALX0	ING	39
	XMAX=X0	ING	40
	GO TO 240	ING	41
200	IF(ALX0-AMIN) 210,220,220	ING	42
210	AMIN=ALX0	ING	43
	XMIN=X0	ING	44
220	IF(ALTIP-AMAX) 240,240,230	ING	45
230	AMAX=ALTIP	ING	46
	XMAX=1.0	ING	47
240	WRITE (L2,350) AMIN,XMIN,AMAX,XMAX	ING	48
	WRITE (L2,360) ALTIP,ALX0	ING	49
	IF(ALL-AMIN) 260,260,250	ING	50

250	ALF=ALL	1ING	51
	GO TO 260	1ING	52
260	TAMIN=AMIN/DELAL	1ING	53
	AMIN=TAMIN	1ING	54
	ALF=AMIN*DELAL	1ING	55
	KI=NX-1	1ING	56
	WRITE (L2,270)	1ING	57
270	FORMAT (/,47H ANGLE OF ATTACK NONDIMENSIONAL RADIUS /)	1ING	58
280	DO 320 J=3,KI	2ING	59
	IF(ALF-ALFAC(J,I)) 290,310,300	2ING	60
290	IF(ALF-ALFAC(J&1,I)) 320,310,310	2ING	61
300	IF(ALF-ALFAC(J&1,I)) 310,310,320	2ING	62
310	Y=(ALF-ALFAC(J,I))*(X(J&1)-X(J))/(ALFAC(J&1,I)-ALFAC(J,I))&X(J)	2ING	63
	WRITE (L2,380) ALF,Y	2ING	64
320	CONTINUE	2ING	65
	ALF=ALF&DELAL	1ING	66
	IF(ALF-ALH) 330,330,340	1ING	67
330	IF(ALF-AMAX) 280,280,340	1ING	68
340	WRITE (L2,370)	1ING	69
	RETURN	ING	70
350	FORMAT(25H MINIMUM ANGLE OF ATTACK=F7.1,7X,10HBLADE STA=F5.3/25H M	ING	71
	AXIMUM ANGLE OF ATTACK=F7.1,7X,10HBLADE STA=F5.3//)	ING	72
360	FORMAT(21H TIP ANGLE OF ATTACK=F7.1,13X,34HBLADE INBOARD END ANGLE	ING	73
	1 OF ATTACK=F7.1//)	ING	74
370	FORMAT (///)	ING	75
380	FORMAT (F14.1,F21.3)	ING	76
	END	ING	77

<pre> SUBROUTINE INVRS(A,N) C DIMENSION A(3,4),D(3,4),IROW(5),ICOL(5) M=N&amp;1   DO 100 I=1,N     IROW(I)=I 100  ICOL(I)=I       DO 250 K=1,K         AMAX= A(K,K)         DO 120 I=K,N           DO 120 J=K,N             IF(ABS( A(I,J))-ABS(AMAX)) 120,110,110 110  AMAX= A(I,J)             IC=I             JC=J 120  CONTINUE             KI=ICOL(K)             ICOL(K)=ICOL(IC)             ICOL(IC)=KI             KI=IROW(K)             IROW(K)=IROW(JC)             IROW(JC)=KI             IF(AMAX) 150,130,150 130  WRITE (L2,140) 140  FORMAT(4H SOLUTION OF EXISTING MATRIX NOT POSSIBLE)             CALL EXIT 150  DO 160 J=1,N             E=A(K,J)             A(K,J)=A(IC,J) 160  A(IC,J)=E             DO 170 I=1,N             E=A(I,K)             A(I,K)=A(I,JC) 170  A(I,JC)=E             DO 200 I=1,N             IF(I-K) 190,180,190 180  A(I,M)=1.             GO TO 200 190  A(I,M)=C. 200  CONTINUE             PVT=A(K,K)             DO 210 J=1,M 210  A(K,J)=A(K,J)/PVT             DO 240 I=1,N             IF(I-K) 220,240,220 220  AMULT=A(I,K)             DO 230 J=1,M 230  A(I,J)=A(I,J)-AMULT*A(K,J) 240  CONTINUE             DO 250 I=1,N </pre>	<pre> INV 1 INV 2 INV 3 INV 4 1INV 5 1INV 6 1INV 7 1INV 8 1INV 9 2INV 10 3INV 11 3INV 12 3INV 13 3INV 14 3INV 15 3INV 16 1INV 17 1INV 18 1INV 19 1INV 20 1INV 21 1INV 22 1INV 23 1INV 24 1INV 25 1INV 26 2INV 27 2INV 28 2INV 29 2INV 30 2INV 31 2INV 32 2INV 33 2INV 34 2INV 35 2INV 36 2INV 37 2INV 38 2INV 39 2INV 40 1INV 41 2INV 42 2INV 43 2INV 44 2INV 45 2INV 46 3INV 47 3INV 48 2INV 49 2INV 50 </pre>
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250 A(I,K)=A(I,M)
    DO 280 I=1,N
      DO 260 L=1,N
        IF(IROW(I)-L) 260,270,260
260 CONTINUE
270 DO 280 J=1,N
280 C(L,J)=A(I,J)
    DO 310 J=1,N
      DO 290 L=1,N
        IF(ICOL(J)-L) 290,300,290
290 CONTINUE
300 DO 310 I=1,N
310 A(I,L)=C(I,J)
320 RETURN
    END

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2INV 51
1INV 52
2INV 53
2INV 54
2INV 55
2INV 56
1INV 57
2INV 58
2INV 59
2INV 60
2INV 61
2INV 62
2INV 63
  INV 64
  INV 65

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	SUBROUTINE CUT2(DMY,LSS1)	OUT	1
		OUT	2
	DIMENSION PSI(24),CPSI(24),SPSI(24),B(24),TH(24),Z(24),	OUT	3
1	ALFAC(12,24),DOUTDR(12,24),DINDR(12,24),X(12),C(12),BD(24),	OUT	4
2	DMDX(12,24),HEAD(17),ALAM(12,24),AMUC(12,24),RHOC(12,24)	OUT	5
	DIMENSION RC(24)	OUT	6
	COMMON L1,L2,L3,L4,L5,L6,L7,L8,ACHK,ALAM,X,PSI,ALFAC,NX,NP,DOUTDR,	OUT	7
	DINDR,NCPBMC,RHO,DMRSQ,E,TH,Z,INTAN,ITERR,ERC,EBD,ETC,ETD,	OUT	8
	2FXC,FZC,ALFAR,AOS,AIS,BIS,THRUST,HFORCE,HP,YFORCE,CT,CH,CP,CY,ED,	OUT	9
	3CPSI,SPSI,XO,ALL,ALH,DELAL,NHARB,C,OMEGA,R,DMDX,HEAD,NOHAR,E2,	OUT	10
	4AMUC,REQ,REQ,AMINF,TIN,LR,GAMM,NXF2,OMEGAR,ALAMO,	OUT	11
	5RC,XREF,DREF,RHCC,DPST,AMU,YNCH,XMOM,XFT(12),CN,SN	OUT	12
	REWIND L3	OUT	13
	WRITE (L2,220) (XFT(J),J=3,NX)	OUT	14
	DO 100 I=1,NP	OUT	15
100	WRITE (L2,300) PSI(I),(ALFAC(J,I),J=3,NX)	OUT	16
	WRITE (L2,250) (XFT(J),J=3,NX)	OUT	17
	DO 110 I=1,NP	OUT	18
110	WRITE (L2,260) PSI(I),(DOUTDR(J,I),J=3,NX)	OUT	19
	WRITE (L2,270) (XFT(J),J=3,NX)	OUT	20
	DO 120 I=1,NP	OUT	21
120	WRITE (L2,260) PSI(I),(DINDR(J,I),J=3,NX)	OUT	22
	WRITE (L2,290) (XFT(J),J=3,NX)	OUT	23
	DO 130 I=1,NP	OUT	24
130	WRITE (L2,260) PSI(I),(DMDX(J,I),J=3,NX)	OUT	25
140	IF(NOHAR) 150,160,150	OUT	26
150	WRITE (L2,230)	OUT	27
	CALL HRANAL (NX,NP,NOHAR,DOUTDR,CPSI,SPSI,XFT,LSS1)	OUT	28
	WRITE (L2,240)	OUT	29
	CALL HRANAL (NX,NP,NOHAR,DINDR,CPSI,SPSI,XFT,LSS1)	OUT	30
	WRITE (L2,280)	OUT	31
	CALL HRANAL (NX,NP,NOHAR,DMDX,CPSI,SPSI,XFT,LSS1)	OUT	32
160	WRITE (L2,170)	OUT	33
170	FORMAT (1H1,//)	OUT	34
	IF(NHARB) 180,200,190	OUT	35
180	WRITE (L2,310)	OUT	36
	NOHAR=NHARB	OUT	37
	CALL HRAIAR(1)	OUT	38
		OUT	39
		OUT	40
	WRITE (L2,190)	OUT	41
190	FORMAT(///)	OUT	42
	WRITE (L2,220)	OUT	43
	CALL HRAIAR(2)	OUT	44
200	IF(INTAN) 210,230,210	OUT	45
210	CALL INTANG(DMY)	OUT	46
		OUT	47
	FORMAT STATEMENTS	OUT	48
220	FORMAT(49X,38HFLADE ANGLE OF ATTACK DISTRIBUTION/63X,11HRAIAR	OUT	49
	1 STA./7H PSI,12F0.4//)	OUT	50

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230 FORMAT(43H1 CUT-OFF-SHAFT PLANE AIR LOADING, LB./FT.//)      OUT 51
240 FORMAT(39H1 IN-SHAFT PLANE AIR LOADING, LB./FT.//)          OUT 52
250 FORMAT(1H139X,40HOUT-OFF-SHAFT PLANE AIR LOADING, LB./FT.//51X,15H OUT 53
      1RADIAL STATION/7H PSI,12F9.4//)                          OUT 54
260 FORMAT(F7.1,12F9.4)                                          OUT 55
270 FORMAT(1H139X,36HIN-SHAFT PLANE AIR LOADING, LB./FT.//51X,15HRADI OUT 56
      1AL STATION/7H PSI,12F9.4//)                              OUT 57
280 FORMAT(41H1 MOMENT ABOUT FEATHERING AXIS FT LB/FT//)       OUT 58
290 FORMAT(1H139X,37HMOMENT ABOUT FEATHERING AXIS FT LB/FT// 51X,15H OUT 59
      1RADIAL STATION/7H PSI,12F9.4//)                          OUT 60
300 FORMAT (F7.1,12F9.4)                                         OUT 61
310 FORMAT(10X,50HHARMONIC ANALYSIS CN BLADE FLAPPING ANGLE(RADIANS)// OUT 62
      142X,13HCOS COMPONENT,7X,13HSIN COMPONENT//)            OUT 63
320 FORMAT(10X,52HHARMONIC ANALYSIS CN BLADE FEATHERING ANGLE(RADIANS) OUT 64
      1//41X,13HCOS COMPONENT,7X,13HSIN COMPONENT//)          OUT 65
330 RETURN                                                       OUT 66
      FND                                                         OUT 67

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SUBROUTINE INFLCW                                INF 1
C
C          3F INFLCW PROGRAM      N. GIANSANTE    INF 2
          DIMENSION RC(24),B(24),RHO(12,24),AMUC(12,24),ALAM(12,24),X(12) INF 3
          DIMENSION PSI(24),CPSI(24),SPSI(24),TH(24),Z(24),RD(24),    INF 4
1        ALFAC(12,24),COUTDR(12,24),DINDR(12,24),C(12),            INF 5
2        DMDX(12,24),HEAD(17)                                       INF 6
          COMMON L1,L2,L3,L4,L5,L6,L7,L8,NCHK,ALAM,X,PSI,ALFAC,NX,NP,DOUTDR, INF 7
          DINDR,NCPBMC,RHO,DMRSQ,F,TH,Z,INTAN,ITERR,ERC,EBD,ETC,ETD,    INF 8
          2FXC,FZC,ALFAR,AOS,AIS,BIS,THRUST,HFORCE,HP,YFORCE,CT,CH,CP,CY,BD, INF 9
          3CPSI,SPSI,XO,ALL,ALH,DELAL,NHARB,C,OMEGA,R,DMDX,HEAD,NOHAR,E2, INF 10
          4AMUC,BEQ,REQ,AMINF,TIN,UR,GAMM,NXF2,OMEGAR,ALAMO,          INF 11
          5RC,XREF,DREF,RHCC,DPSI,APU,YMOM,XMOM,XFT(12),CN,SN,VLL(12,24) INF 12
          GAMM1=GAMM-1.                                               INF 13
          GAMP1=GAMM&1.                                             INF 14
          AMIN2=AMINF*AMINF                                          INF 15
          CO3=AMIN2-1.                                               INF 16
          RD=REQ&DREF                                               INF 17
          CALL INTRSC(NP,AMINF,XREF,RD,BEQ,E2,R,B,RC,ALFAR,XP,N1)    INF 18
          WRITE (L2,100)                                             INF 19
100      FORMAT (1H1,5X,56H POINTS OF INTERSECTION OF ROW SHOCK WAVE AND RD INF 20
          1TOP DISK ,//,10X,9H AZIMUTH,2X,8H RADIUS ,/)            INF 21
          WRITE (L2,110) (PSI(I),RC(I), I = 1,NP)                   INF 22
110      FORMAT (10X,F10.1,F10.3)                                    INF 23
          IF(XP) 130,120,130                                         INF 24
120      XP=R                                                         INF 25
130      XPE1=XP-E2                                                 INF 26
          XPOR=(XREF&DRFF&REQ)-(E2&XPF1*COS(B(N1))) * COS(ALFAR)    INF 27
          LG(BEQ&XPE1 * SIN(B(N1))) * SIN(ALFAR)                   INF 28
140      PHIM=ATAN( XPOR/SQRT((XPCR*XPOR-XREF*XREF)*CO3))          INF 29
          PHIMM= AMIN2 * SIN(PHIM) * SIN(PHIM)                      INF 30
          RINPO=GAMP1*PHIMM/(GAMM1*PHIMM&2.)                       INF 31
          RHO1=RINPO*RHO                                             INF 32
          VRAO =SQRT(1.0-4.0*(PHIM-1.0)*(GAMM*PHIMM&1.0)/          INF 33
          1(PHIMM*AMIN2*GAMP1**2))                                   INF 34
          VEL1=AMINF * SQRT(GAMM*UR*TIN*37.1739)                    INF 35
          VC=VRAO*VEL1/OMEGAR                                        INF 36
          VCS = VC * SIN(ALFAR)                                      INF 37
          VCC = VC * COS(ALFAR)                                      INF 38
          SIN1 = 1. - .5 * SIN(ALFAR)                                INF 39
          RHO2 = RHO1 * SIN1 * VC ** 2                               INF 40
          COS2 = COS(ALFAR)                                          INF 41
          RHO3 = .2 * PHC * (1. & 3. * COS2) * (VEL1 / OMEGAR) ** 2 INF 42
          DO 150 I=1,NP                                             1INF 43
          COS1 = (1. & 3. * COS(PSI(I) / 57.2958)) * COS2 ** 2     1INF 44
          DO 150 J=1,NXF2                                           2INF 45
          RHO( J, I) = ( RHO2 & .5 * (RHO3 - RHO2) * COS1) / VLL(J,I) ** 2 2INF 46
          ALAM(J,I)=VCS                                             2INF 47
150      AMUC(J,I) = VCC                                           2INF 48
          DO 200 I=1,NP                                             1INF 49
          200

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	IF(RC(I)) 200,200,160	1INF	51
160	RC(I)=RC(I)/R	1INF	52
	DO 190 J=1,NXF2	2INF	53
	IF(X(J)-RC(I)) 190,190,170	2INF	54
170	DO 180 L=J,NXF2	3INF	55
	RHOC(L,I)=RHOC	3INF	56
	AMUC(L,I)=AMUC	3INF	57
180	ALAM(L,I)=ALAMC	3INF	58
	GO TO 200	2INF	59
190	CONTINUE	2INF	60
200	CONTINUE	1INF	61
C		INF	62
C	WRITE RHOC,AMUC,ALAM	INF	63
C		INF	64
	WRITE (L2,210)	INF	65
	WRITE (L2,260) (XFT(NRW),NRW = 3,NXF2)	INF	66
	WRITE (L2,290)	INF	67
210	FORMAT (1H1,/,30X,20H DENSITY DISTRIBUTION )	INF	68
	DO 220 NRW = 1,NP	1INF	69
220	WRITE (L2,230) PSI(NRW),(RHOC(NCL,NRW),NCL = 3,NXF2)	1INF	70
230	FORMAT (F7.1,12F9.4)	INF	71
	WRITE (L2,240)	INF	72
240	FORMAT(//,30X,13H ADVANCE RATIO )	INF	73
	WRITE (L2,280) (XFT(NRW),NRW = 3,NXF2)	INF	74
	WRITE (L2,290)	INF	75
	DO 250 NRW = 1,NP	1INF	76
250	WRITE (L2,230) PSI(NRW),(AMUC(NCL,NRW),NCL = 3,NXF2)	1INF	77
	WRITE (L2,260)	INF	78
	WRITE (L2,280) (XFT(NRW),NRW = 3,NXF2)	INF	79
	WRITE (L2,290)	INF	80
260	FORMAT (1H1,/,30X,19H INFLOW DISTRIBUTION )	INF	81
	DO 270 NRW = 1,NP	1INF	82
270	WRITE (L2,230) PSI(NRW),(ALAM(NCL,NRW),NCL = 3,NXF2)	1INF	83
280	FORMAT (/,30X,17H RADIAL STATION,FT ,/,7X,12F9.4)	INF	84
290	FORMAT (7H PSI )	INF	85
	ANX=NXF2	INF	86
	ANP=NP	INF	87
	ALAM0=0.	INF	88
	AMU=0.	INF	89
	DO 310 I=1,NP	1INF	90
	AVG=0.	1INF	91
	AVGM=0.	1INF	92
	DO 300 J=1,NXF2	2INF	93
	AVGM=AVGM&AMUC(J,I)	2INF	94
300	AVG=AVG&ALAM(J,I)	2INF	95
	AMU=AMU&AVGM	1INF	96
310	ALAM0=ALAM0&AVG	1INF	97
	ALAM0=ALAM0/(ANP*ANX)	INF	98
	AMU=AMU/(ANP*ANX)	INF	99
	RETURN	INF	100

END

INF 101

	SUBROUTINE INTRSC (N,AM,A,RC,B,C,RAD,BETA,RC,AS,XP,N1)	INC	1
C	INTERSECTION OF HYPERBOLICAL SHOCK WAVE AND CONED, FLAPPING ROTOR	INC	2
	DIMENSION R(4),BETA(24),RC(24)	INC	3
	CAS=COS(AS)	INC	4
	SAS=SIN(AS)	INC	5
	V=A&R0	INC	6
	AM2 = AM*AM-1.	INC	7
	AN = N	INC	8
	DPSID = 360.0 / AN	INC	9
	DPSIR=DPSID/57.296	INC	10
	A2=A*A	INC	11
	DO 100 I=1,4	INC	12
100	R(I)=0.	INC	13
	PSIR=0.	INC	14
	PSID=0.	INC	15
	N1=N/2&1	INC	16
	DO 310 I=1,N1	INC	17
	RC(I)=0.0	INC	18
	NR=0	INC	19
	S=SIN(PSIR)	INC	20
	C=COS(PSIR)	INC	21
	SS=S*S	INC	22
	CB=COS(BETA(I))	INC	23
	SB=SIN(BETA(I))	INC	24
	C10=CAS*C	INC	25
	C20=-SAS*C	INC	26
	C1=C10*CB&SAS*SB	INC	27
	C2=C20*CB&CAS*SB	INC	28
	C3=B*SAS&0*CAS*C&V	INC	29
	C4=B*CAS-0*SAS*C	INC	30
	D0=C10*C10-(C20*C20&CB*CB*SS)*AM2	INC	31
	E0=C10*C3-(C20*C4&0*CB*SS)*AM2	INC	32
	F=C3*C3-(C4*C4&0*0*SS)*AM2-A2	INC	33
	IF(00) 150,110,150	INC	34
110	R1=-F/2.0/E0&0	INC	35
120	IF(R1) 200,140,130	INC	36
130	IF(R1-0) 140,140,200	INC	37
140	NR=NR&1	INC	38
	R(NR)=R1	INC	39
	GO TO 200	INC	40
150	E0=E0/DC	INC	41
	SURD=E0*E0-F/DC	INC	42
	IF(SURD) 200,160,170	INC	43
160	R1=-F&E0	INC	44
	GO TO 120	INC	45
170	ROOT=SQRT(SURD)	INC	46
	R1=-F&E0-ROOT&0	INC	47
	R2=-F&E0+ROOT&0	INC	48
	IF(R2) 120,180,180	INC	49
		INC	50

180 IF(R2=0) 190,190,120	11NC	51
190 NR=NR&1	11NC	52
R(NR)=R2	11NC	53
GO TO 120	11NC	54
200 D=C1*C1-(C2*C2&CB*CB*SS)*AM2	11NC	55
E=C1*C3-(C2*C4&CB*CB*SS)*AM2	11NC	56
IF(D) 250,210,250	11NC	57
210 R1=-F/2.0/E&D	11NC	58
220 IF(R1=0) 300,300,230	11NC	59
230 IF(R1=RADI) 240,240,300	11NC	60
240 NR=NR&1	11NC	61
R(NR)=R1	11NC	62
GO TO 300	11NC	63
250 E=E/D	11NC	64
SURD=E*E-F/D	11NC	65
IF(SURD) 300,260,270	11NC	66
260 R1=-E&D	11NC	67
GO TO 220	11NC	68
270 ROOT=SQRT(SURD)	11NC	69
R1=-E&RCOT&D	11NC	70
R2=-E-RCOT&D	11NC	71
IF(R2=0) 220,220,280	11NC	72
280 IF(R2=RADI) 290,290,220	11NC	73
290 NR=NR&1	11NC	74
R(NR)=R2	11NC	75
GO TO 220	11NC	76
300 RC(I)=R(I)	11NC	77
PSID=PSID&EPSID	11NC	78
310 PSIR=PSIR&DPSIR	11NC	79
XP=RC(N1)	INC	80
K=N1&1	INC	81
J=1	INC	82
DO 320 I=K,N	11NC	83
J=J&1	11NC	84
KJ=K-J	11NC	85
320 RC(I)=PC(KJ)	11NC	86
RETURN	INC	87
END	INC	88

	SUBROUTINE REVC7	RV7	1
C		RV7	2
C	RFFENTRY VEHICLE STABILITY	RV7	3
C		RV7	4
C		RV7	5
	DIMENSION PRMT(5),F(6),FR(6)	RV7	6
	DIMENSION A(9,13)	RV7	7
	EXTERNAL DERIV	RV7	9
	REAL M,IX,IY,IZ,JXZ,I1,I2,I3,I4,I5,I6,I7,I8,IP	RV7	9
	COMMON L1, L2, L3, L4, L5, L6, L7, L8, I3F,ITEST	RV7	10
	COMMON M,IX,IY,IZ,JXZ,I1,I2,I3,I4,I5,I6,I7,I8,ALPHA,R,	RV7	11
	2IR,G,NALPHA,COEF(20,4),BMC,NTOR,AZ,DQ,B	RV7	12
	3,FR,FY,T,A1,B1,VPEL,SY(4),TCL(8),FR,H	RV7	13
	4, RDUM,VDUM,ODUM,CT,PRMT,ZZMX,ZZMY,ZZMZ,ZMXO,ZMYO,ZMZO	RV7	14
	REWIND L3	RV7	15
	REWIND L8	RV7	16
	READ (L8) G,AZ,BMC,M,IX,IY,IZ,JXZ,DO,I1,I2,I3,I4,I5,I6,NDIM	RV7	17
	1,I7,I8,B,IR,MACH,MACH1,MACH2	RV7	18
	2,BM1,NALPHA,((COEF(I,J),I=1,NALPHA),J=1,4),SIDSLP	RV7	19
	3,R,(TOL(I),I=1,8)	RV7	20
	READ (L8) AMUFS,ALAMFS,AMOCK,ITEST	RV7	21
	READ (L8) A,(PRMT(I),I=1,4),I3F	RV7	22
	READ (L8) RDUM,VDUM,ODUM,ZZMX,ZZMY,ZZMZ	RV7	23
	READ (L3)	RV7	24
	READ (L3)	RV7	25
	READ (L3) DQ,FR,FY,T,A1,B1,CT	RV7	26
	IF (I3F) I10,I10,I10	RV7	27
100	READ (L8) VREF,A(1,3),(SY(I),I=1,3)	RV7	28
	A(1,2) = VREF * SIN(SIDSLP/57.2958)	RV7	29
	A(1,1) = SQRT(VREF**2 - A(1,2)**2 - A(1,3)**2)	RV7	30
	A(1,1) = -A(1,1)	RV7	31
	A(1,3) = -A(1,3)	RV7	32
C	AMU=SY(2)	RV7	33
C	ALAM=SY(3)	RV7	34
C	OMEGA=SY(4)	RV7	35
	GO TO 120	RV7	36
110	READ (L8) VREF,DMMY,(SY(I),I=1,3)	RV7	37
120	SY(4)=A(1,7)	RV7	38
	IF(A(1,8)) 140,130,140	RV7	39
130	A(1,8)=SY(1)	RV7	40
140	IF(A(1,9)) 160,150,160	RV7	41
150	A(1,10)=SIDSLP	RV7	42
160	NTOR = 1	RV7	43
		RV7	44
	CALCULATE INITL ACCELERATIONS	RV7	44
	WRITE (12,170)	RV7	45
170	FORMAT (1H1,59X,12HTIME HISTORY///6X,6HT(SEC),7X,9HU(FT/SEC),6X	RV7	46
	1 9HV(FT/SEC),6X,9HW(FT/SEC),5X,10HP(RAD/SEC),5X,10HQ(RAD/SEC),5X,	RV7	47
	2 10HR(RAD/SEC),4X,14HOMEGA(RAD/SEC)/19X,10HTHETA(RAD),5X,	RV7	48
	3 9HPHI(RAD),7X,9HPST(RAD),9X,5HX(FT),10X,5HY(FT),10X,5HZ(FT)//	RV7	49
	LINE = 3	RV7	50

PRMT(5) = 2.0	RV7	51
X = PRMT(1)	RV7	52
H = PRMT(3)	RV7	53
WRITE (L2,180) X,(A(1,1), I = 1,13)	RV7	54
180 FORMAT (4X,F8.3,2X,1P7E15.4 / 14X,1P6E15.4//)	RV7	55
C CALCULATE TIME HISTORY	RV7	56
190 CALL RESULT (A,1,X)	RV7	57
H1=H/10.	RV7	58
KOUNT=0	RV7	59
IF(PRMT(5)-1.) 210,210,200	RV7	60
200 CALL ADAMS(X,A,DERIV,H1,-1,13)	RV7	61
210 CALL ADAMS(X,A,DERIV,H1,1,13)	RV7	62
KOUNT=KOUNT&1	RV7	63
IF(KOUNT-10) 210,220,220	RV7	64
220 CALL RESULT (A,2,X)	RV7	65
IF(ITEST-2) 230,250,230	RV7	66
230 WRITE (L2,240) ZMXD,ZMYC,ZMZD	RV7	67
240 FORMAT (///10X,47HMGRETS ACCDED TO BRING VEHICLE INTO TRIM AT T=0	RV7	68
1 //15X,3HMZ=F10.2,6H FT-LB/15X,3HMY=F10.2,6H FT-LB/15X,3HMZ=F10.2	RV7	69
2 ,6H FT-LB///)	RV7	70
LINE=LINE&12	RV7	71
250 IF (LINE - 43) 270,260,260	RV7	72
260 WRITE (L2,170)	RV7	73
LINE = 3	RV7	74
270 WRITE (L2,180) X,(A(1,1), I = 1,13)	RV7	75
LINE = LINE & 3	RV7	76
IF (X - PRMT(2)) 310,280,280	RV7	77
280 WRITE (L2,290)	RV7	78
290 FORMAT (///,30X,24HEND OF CASE - END OF RUN )	RV7	79
WRITE (L2,300)	RV7	80
300 FORMAT (30X,29HEND OF JOB NORMAL TERMINATION )	RV7	81
CALL EXIT	RV7	82
310 CALL CHECK (A,ADIM,ALAPFS,AMUFS,AMOCK,X)	RV7	83
IF (PRMT(5)) 150,320,150	RV7	84
320 RETURN	RV7	85
END	RV7	86

	SUBROUTINE DERIV (X,A)	DRV	1
	DIMENSION PRMT(5) ,F(6),FR(6),A(9,13)	DRV	2
	REAL M,IX,IY,IZ,JXZ,I1,I2,I3,I4,I5,I6,I7,I8,IR	DRV	3
	COMMON L1, L2, L3, L4, L5, L6, L7, L8, I3F,I7EST	DRV	4
	COMMON M,IX,IY,IZ,JXZ,I1,I2,I3,I4,I5,I6,I7,I8,ALPHA,R,	DRV	5
	ZIR,G,NALPHA,COEF(20,4),PMC,NTOR,AZ,DQ,B	DRV	6
	3, FH,FY,T,A1,B1,VREL ,SY(4),TCL(8),FR,H	DRV	7
	4, RDUM,VDUM,ODUM,CT,PRMT,ZZMX,ZZMY,ZZMZ,ZMXO,ZMYO,ZMZO	DRV	8
	UV = SQRT(A(1,1)*A(1,1) & A(1,2)*A(1,2))	DRV	9
	IF (UV) 110,100,110	DRV	10
100	ALPHA = 1.5708	DRV	11
	GO TO 120	DRV	12
110	ALPHA=ATAN(-A(1,3)/UV)	DRV	13
120	SINT = SIN(A(1,8))	DRV	14
	COST = COS(A(1,8))	DRV	15
	COSP = COS(A(1,9))	DRV	16
	SINP = SIN(A(1,9))	DRV	17
	COSPS = COS(A(1,10))	DRV	18
	SINPS = SIN(A(1,10))	DRV	19
	IF (A(1,1)) 140,130,140	DRV	20
130	RO = 1.5708*A(1,2)/ABS(A(1,2))	DRV	21
	GO TO 150	DRV	22
140	RO = ATAN(A(1,2)/A(1,1))	DRV	23
150	SIRO = SIN(RO)	DRV	24
	CORO = COS(RO)	DRV	25
	COSA = COS (ALPHA)	DRV	26
	SINA = SIN (ALPHA)	DRV	27
	FR(1) = (FH * CORO - FY * SIRC) / M	DRV	28
	FR(2) = (FY * CORO & FH * SIRC) / M	DRV	29
	FR(3)=T/M	DRV	30
	FR(4)= ( B1* CORO -A1* SIRO )/IX	DRV	31
	FR(5)= ( B1* SIRO & A1* CORO )/IY	DRV	32
	FR(6) = DQ/IR	DRV	33
160	VREL2=( A(1,1)*A(1,1) & A(1,2)*A(1,2) & A(1,3)*A(1,3))*VDUM**2	DRV	34
	VREL = SQRT( VREL2 )	DRV	35
	IF(ALPHA-CCFF(1,1)) 170,170,180	DRV	36
170	IA=1	DRV	37
	I=2	DRV	38
	GO TO 230	DRV	39
180	IF(ALPHA-CCFF(NALPHA,1)) 200,190,190	DRV	40
190	IA=NALPHA-1	DRV	41
	I=NALPHA	DRV	42
	GO TO 230	DRV	43
200	DO 210 I=1,NALPHA	DRV	44
	IF(ALPHA-CCFF(I,1)) 220,220,210	DRV	45
210	CONTINUE	DRV	46
	I=NALPHA	DRV	47
220	IA=I-1	DRV	48
230	AL1=COEF(IA,1)	DRV	49
	AL2=COEF(I ,1)	DRV	50

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DAL=AL2-AL1
F1=(AL2-ALPHA)/DAL
F2=(ALPHA-AL1)/CAL
CLR=F1 *COEF(IA,2)&F2*CEEF(I ,2)
CDB=F1 *COEF(IA,3)&F2*CEEF(I ,3)
CMB=F1 *COEF(IA,4)&F2*CEEF(I ,4)
CLBV=CLB*VRFL2
CDBV=CDB*VREL2
CMBV=CMB*VREL2
COMB = CDBV * COSA - CLBV * SINA
F(1) = CCMB * CCRO / M
F(2) = CCMB * SIRO / M
F(3) = (CLBV * COSA & CDBV * SINA)/M
F(4) = -CMBV * SIRO / I
F(5) = CMBV * CCRO / IY
F(6) = F(2)
IF(ITFST-1) 250,240,250
240 ZZMX1=(F(4)&FR(4)-(B*FR(2)&BMC*F(2))*M/IX)*I3
ZZMX2=(FR(2)&F(2))*AZ*M*I4/I2
ZZMX=ZZMX1-ZZMX2
ZZMY1=F(5)&FR(5)
ZZMY2=(B*FR(1)&AZ*(FR(3)&F(3))&BMC*F(1))*M/IY
ZZMY=ZZMY1&ZZMY2
ZZMZ=-(FR(2)&F(6))*M*AZ/I2
ZMX0= ZZMX1*IX/I3-ZZMX2*I7/I4
ZMY0= ZZMY*IY
ZMZ0= ZZMZ*I2
ITFST=3
250 A(2,1) = A(1,6)*A(1,2)-A(1,5)*A(1,3)&G*SINT& F(1)&FR(1)
A(2,2) = A(1,4)*A(1,3)-A(1,6)*A(1,1)-G*COST*SINP&F(2)&FR(2)
A(2,3) = A(1,5)*A(1,1)-A(1,4)*A(1,2)-G*COST*COSP&F(3)&FR(3)
A(2,4) = A(1,4)*A(1,5)*I1&A(1,5)*A(1,6)*I2&(F(4)&FR(4)-(B*FR(2)
1 &BMC*F(2))*M/IX)*I3-((FR(2)&F(6))*M*AZ I*I4/I2 -ZZMX
A(2,5) = A(1,4)*A(1,6)*I5&I6*(A(1,6)*A(1,6)-A(1,4)*A(1,4))&F(5)
1&(B*FR(1)&AZ*(FR(3)&F(3))&BMC*F(1))*M/IY&FR(5) -ZZMY
A(2,6) = (B*A(1,4)*A(1,5)&(A(2,4)-A(1,5)*A(1,6))*I7-((FR(2)&F(6)
1 )*M*AZ I/I7 -ZZM7
A(2,7) = A(2,6)-FR(6)
A(2,8) = A(1,5)*COSP-A(1,6)*SINP
A(2,9) = A(1,4)&(A(1,5)*SINF&A(1,6)*COSP)*(SINT/COST)
A(2,10) = (A(1,5)*SINP&A(1,6)*COSP)/COST
AA = A(1,1)*COST&(A(1,2)*SINP&A(1,3)*COSP)*SINT
BB = A(1,2)*COSP-A(1,3)*SINP
A(2,11) = AA*CCSPS-BB*SINPS
A(2,12) = AA*SINPS&BB*CCSPS
A(2,13) = -A(1,1)*SINT&(A(1,2)*SINP&A(1,3)*COSP)*COST
RETURN
END
DRV 51
DRV 52
DRV 53
DRV 54
DRV 55
DRV 56
DRV 57
DRV 58
DRV 59
DRV 60
DRV 61
DRV 62
DRV 63
DRV 64
DRV 65
DRV 66
DRV 67
DRV 68
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DRV 94
DRV 95
DRV 96
DRV 97
DRV 98

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SUBROUTINE CHECK (A,NDIP,ALAMFS,AMUFS,NMOCK,X)	CHK 1
DIMENSION A(9,13),PRMT(5),F(6),FR(6)	CHK 2
1 ,RHOC(12,24),Y1(4),ALAP(12,24),AMUC(12,24)	CHK 3
REAL M,IX,IY,IZ,JXZ,I1,I2,I3,I4,I5,I6,I7,I8,IR	CHK 4
COMMON L1, L2, L3, L4, L5, L6, L7, L8, I3F,ITEST	CHK 5
COMMON M,IX,IY,IZ,JXZ,I1,I2,I3,I4,I5,I6,I7,I8,ALPHA,R,	CHK 6
2IR,G,NALPHA,CDEF(20,4),PMC,NTOR,AZ,DQ,B	CHK 7
3, FH,FY,T,A1,B1,VREL ,SY(4),TCL(8),FR,H	CHK 8
4, RDUM,VDUM,ODUM,CT,PRMT,ZZMX,ZZMY,ZZMZ,ZMXO,ZMYO,ZMZO	CHK 9
Y1(1)=ALPHA	CHK 10
OMEGAR=A(1,7)*P	CHK 11
CCN=1.0/OMEGAR	CHK 12
VREL=SQRT(A(1,1)*A(1,1)+A(1,2)*A(1,2)+A(1,3)*A(1,3))	CHK 13
IF(A(1,1)) 110,100,110	CHK 14
100 RO=1.5708*A(1,2)/ABS(A(1,2))	CHK 15
GO TO 120	CHK 16
110 RO = ATAN (A(1,2)/A(1,1))	CHK 17
120 CORO = COS(RO)	CHK 18
STRO = SIN(RO)	CHK 19
Y1(2)=VREL*CCS(Y1(1))*CCN	CHK 20
IF(NMOCK-1) 130,160,130	CHK 21
130 IF(Y1(2)) 140,150,140	CHK 22
140 Y1(3)=Y1(2)*SIN(Y1(1))/CCS(Y1(1))-5*CT/SQRT(Y1(2)**2+SY(3)**2)	CHK 23
GO TO 170	CHK 24
150 Y1(3)=.5*(VREL/OMEGAR+SQRT((VREL/OMEGAR)**2-2.*CT))	CHK 25
GO TO 170	CHK 26
160 Y1(3)=VREL*SIN(Y1(1))/OMEGAR	CHK 27
170 Y1(4)=A(1,7)	CHK 28
DO 200 I=1,4	CHK 29
DDY=Y1(I)-SY(I)	CHK 30
IF(ABS(DDY)-TCL(I)) 200,200,180	CHK 31
180 IF(SY(I)) 190,210,190	CHK 32
190 IF(ABS(DDY/SY(I))-TCL(I/4)) 200,200,210	CHK 33
200 CONTINUE	CHK 34
NTOR=2	CHK 35
PRMT(5)=1.	CHK 36
RETURN	CHK 37
210 REWIND LB	CHK 38
220 PRMT(1)=X	CHK 39
PRMT(5) = C.O	CHK 40
I3F=1	CHK 41
AMUFS=Y1(2)	CHK 42
ALAMFS=Y1(3)	CHK 43
ITEST=7	CHK 44
READ (LB)	CHK 45
WRITE (LB) AMUFS,ALAMFS,NMOCK,ITEST	CHK 46
WRITE (LB) A,(PRMT(I),I=1,4),I3F	CHK 47
WRITE (LB) RDUM,VDUM,ODUM,ZZMX,ZZMY,ZZMZ	CHK 48
WRITE (LB) VREL,A(1,3),Y1(1),AMUFS,ALAMFS	CHK 49
IF(SY(3)) 240,230,240	CHK 50

230	CCN=Y1(3)	CHK	51
	GO TO 250	CHK	52
240	CON = Y1(3)/SY(3)	CHK	53
250	REWIND L3	CHK	54
	RFAD (L3) LCCN,NXF2,NP,((ALAM(J,I),AMUC(J,I),RHOC(J,I),J=1,NXF2),	CHK	55
	II=1,NP)	CHK	56
	READ (L3) NTPR,Q2,P2,CMEGA,ALANO,AMU,TORQSV,ALFAR	CHK	57
	IF(SY(2)) 270,260,270	CHK	58
260	CON1=Y1(2)	CHK	59
	GO TO 280	CHK	60
270	CON1=Y1(2)/SY(2)	CHK	61
280	IF(SY(2)) 300,290,300	CHK	62
290	IF(SY(3)) 330,310,330	CHK	63
300	IF(SY(3)) 350,310,350	CHK	64
310	DO 320 I=1,NP	1CHK	65
	DO 320 J=1,NXF2	2CHK	66
	AMUC(J,I)=CON1*AMUC(J,I)	2CHK	67
320	ALAM(J,I)=CON	2CHK	68
	GO TO 370	CHK	69
330	DO 340 I=1,NP	1CHK	70
	DO 340 J=1,NXF2	2CHK	71
	AMUC(J,I)=CON1	2CHK	72
340	ALAM(J,I)=CON*ALAM(J,I)	2CHK	73
	GO TO 370	CHK	74
350	DO 360 I=1,NP	1CHK	75
	DO 360 J=1,NXF2	2CHK	76
	AMUC(J,2)=CON1*AMUC(J,I)	2CHK	77
360	ALAM(J,I)=CON*ALAM(J,I)	2CHK	78
370	IF (Y1(4)) 390,380,390	CHK	79
380	CON1 = C.0	CHK	80
	GO TO 400	CHK	81
390	CON1=2./Y1(4)	CHK	82
400	Q2 = (A(1,5) * CORO - A(1,4) * SIRO ) * CON1	CHK	83
	P2 = (A(1,5) * SIRO & A(1,4)*CCRO)*CON1	CHK	84
	REWIND L3	CHK	85
	WRITE (L3) LCCN,NXF2,NP,((ALAM(J,I),AMUC(J,I),RHOC(J,I),J=1,NXF2),	CHK	86
	II=1,NP)	CHK	87
	WRITE (L3) NTPR,Q2,P2,A(1,7),Y1(3),Y1(2),TORQSV,Y1(1)	CHK	88
	RETURN	CHK	89
	END	CHK	90

	SUBROUTINE RESLT (A,IJ,X)	RST	1
	DIMENSION A(9,13),FR(6),PRMT(5)	RST	2
	REAL M,IX,IY,IZ,JXZ,I1,I2,I3,I4,I5,I6,I7,I8,IR	RST	3
	COMMON L1, L2, L3, L4, L5, L6, L7, L8, I3F,ITEST	RST	4
	COMMON M,IX,IY,IZ,JXZ,I1,I2,I3,I4,I5,I6,I7,I8,ALPHA,R,	RST	5
	ZIR,G,NALPHA,COEF(20,4),BMC,NTOR,AZ,DQ,B	RST	6
	3, FH, FY, T, A1, B1, VREL, SY(4), TOL(8), FR, H	RST	7
	4, RDUM, VDUM, ODUM, CT, PRMT, ZZMX, ZZMY, ZZMZ, ZMXO, ZMYO, ZMZO	RST	8
C	IJ=1 REDUCF MAGNITUDE	RST	9
C	IJ=2 RETURN REDUCED TERMS TO ORIGINAL FORM	RST	10
	ODUM2=ODUM*ODUM	RST	11
	VO2=ODUM2*RDUM	RST	12
	IF(IJ-2) 100,130,100	RST	13
100	DO 110 J=1,3	IRST	14
	A(I,J)=A(I,J)/VDUM	IRST	15
110	A(I,J&10)=A(I,J&10)/RDUM	IRST	16
	DO 120 J=4,7	IRST	17
120	A(I,J)=A(I,J)/CDUM	IRST	18
	X=X*ODUM	RST	19
	H=H*ODUM	RST	20
	IX=IX*ODUM2	RST	21
	IY=IY*ODUM2	RST	22
	IZ=IZ*ODUM2	RST	23
	JXZ=JXZ*ODUM2	RST	24
	IR=IR*ODUM2	RST	25
	M=M*VO2	RST	26
	G=G/VO2	RST	27
	RETURN	RST	28
130	DO 140 J=1,3	IRST	29
	A(I,J)=A(I,J)*VDUM	IRST	30
140	A(I,J&10)=A(I,J&10)*RDUM	IRST	31
	DO 150 J=4,7	IRST	32
150	A(I,J)=A(I,J)*CDUM	IRST	33
	X=X/ODUM	RST	34
	H=H/ODUM	RST	35
	IX=IX/ODUM2	RST	36
	IY=IY/ODUM2	RST	37
	IZ=IZ/ODUM2	RST	38
	JXZ=JXZ/ODUM2	RST	39
	IR=IR/ODUM2	RST	40
	M=M/VO2	RST	41
	G=G*VO2	RST	42
	RETURN	RST	43
	END	RST	44

	SUBROUTINE ACAPS(T,A,DERIV,F,K,N)	ADM	1
	DIMENSION A(9,13)	ADM	2
C		ADM	3
C	DO LOOPS ON THE SECOND SUBSCRIPT IN THE A ARRAY ARE INDICATED BY	ADM	4
C	J=1(1)N IN THE COMMENTS. THE SUBSCRIPT J DENOTES THE JTH COMPONENT	ADM	5
C	OF WHATEVER VECTOR IS INDICATED (I.E., THE JTH COMPONENT OF X, F,	ADM	6
C	ETC.). SECOND SUBSCRIPT IS OMITTED IN THE COMMENTS (I.E., A1=A(1,J)	ADM	7
C	A2=A(2,J), ETC.).	ADM	8
C		ADM	9
C	NOTATION--	ADM	10
C	T=INDEPENDENT VARIABLE	ADM	11
C	A=ARRAY OF DEPENDENT VARIABLES, DERIVATIVES, BACKWARD DIFFERENCES,	ADM	12
C	DERIV=NAME OF THE SUBROUTINE THAT CALCULATES THE DERIVATIVES	ADM	13
C	AND FIRST SUPS	ADM	14
C	F(X,T) AND STORES THEM IN A2 FOR J=1(1)N.	ADM	15
C	H=INCREMENT OF INTEGRATION (I.E., INTEGRATION STEP, STEP-SIZE, OR	ADM	16
C	DELTA T)	ADM	17
C	K=ENTRY CODE (DEFINED BELOW)	ADM	18
C	N=NUMBER OF FIRST ORDER DIFFERENTIAL EQUATIONS	ADM	19
C		ADM	20
C	FOR A DISCUSSION OF THE METHOD SEE NASA TN D-2936, SELF-STARTING	ADM	21
C	MULTISTEP METHODS FOR THE NUMERICAL INTEGRATION OF ORDINARY	ADM	22
C	DIFFERENTIAL EQUATIONS, BY WILLIAM A. MERSMAN, JULY, 1965.	ADM	23
C		ADM	24
C	ENTRY POINT--BEGIN SUBROUTINE--	ADM	25
C		ADM	26
C	IF (N) 110,100,110	ADM	27
C	100 CALL EXIT	ADM	28
C	110 DT=H	ADM	29
C	R=T	ADM	30
C	M=N	ADM	31
C		ADM	32
C	SELECT MODE--	ADM	33
C	A. FORWARD STARTER (K=0)	ADM	34
C	B. BACKWARD STARTER (K=-1)	ADM	35
C	C. INTEGRATE ONE STEP WITH PREDICTOR - CORRECTOR (K GE 1)	ADM	36
C		ADM	37
C		ADM	38
C	IF (K) 130,120,400	ADM	39
C	-- FORWARD - BACKWARD STARTER - - - - -	ADM	40
C		ADM	41
C	H IS SET TO -H IF THE FORWARD STARTER IS REQUESTED.	ADM	42
C	THE CODING IS WRITTEN FOR THE BACKWARD STARTER.	ADM	43
C		ADM	44
C	BEFORE THE FORWARD OR BACKWARD STARTERS CAN BE EXECUTED THE A	ADM	45
C	ARRAY MUST CONTAIN --	ADM	46
C	A1=X0, THE INITIAL VALUES OF X FOR J=1(1)N, ALSO SET T=T0, THE	ADM	47
C	INITIAL VALUE OF T.	ADM	48
C		ADM	49
C	120 DT=-DT	ADM	50

130	D=DT/1440.	ADM	51
	CALL DERIV(B,A)	ADM	52
	DO 150 J=1,M	1ADM	53
	A(9,J)=A(1,J)	1ADM	54
	A(8,J)=A(1,J)-C <sub>5</sub> *DT*A(2,J)	1ADM	55
	DO 140 I=3,7	2ADM	56
140	A(I,J)=A(2,J)	2ADM	57
150	CONTINUE	1ADM	58
C		ADM	59
C	STATEMENTS 2 - 24 CALCULATES F0, SAVES X0, SETS F0=F1=F2=F3=F4,	ADM	60
C	AND COMPUTES FS4 (THE FIRST SUM AT T=T064H). THIS COMMENT, AND ALL	ADM	61
C	FURTHER COMMENTS FOR THE FORWARD STARTER, APPLIES TO THE BACKWARD	ADM	62
C	STARTER, TOO, IN WHICH CASE REPLACE F1 BY F-1, F2 BY F-2, F3 BY	ADM	63
C	F-3, F4 BY F-4, FS4 BY FS0 AND X1 TO X4 BY X-1 TO X-4.	ADM	64
C		ADM	65
C	THE A ARRAY NOW CONTAINS FOR J=1(1)N	ADM	66
C	A1=X0	ADM	67
C	A2=F0	ADM	68
C	A3=F0	ADM	69
C	A6=F0	ADM	70
C	A7=F0	ADM	71
C	A8=FS4 OR FS0	ADM	72
C	A9=X0	ADM	73
C		ADM	74
	DO 260 I=1,8	1ADM	75
160	A=8-DT	1ADM	76
C		1ADM	77
C	SET T=T06H OR T=T0-H	1ADM	78
C		1ADM	79
	DO 170 J=1,M	2ADM	80
170	A(1,J)=A(8,J)&D*(11.0*A(7,J)-66.0*A(6,J)&192.0*A(5,J)-830.0*A(4,J)	2ADM	81
	1-1467.0*A(3,J))	1ADM	82
	CALL DERIV(B,A)	1ADM	83
	DO 180 J=1,M	2ADM	84
180	A(4,J)=A(2,J)	2ADM	85
C		1ADM	86
C	A NOW CONTAINS FOR J=1(1)N	1ADM	87
C	A1=X1 OR X-1	1ADM	88
C	A2=F1 OR F-1	1ADM	89
C	A3=F0	1ADM	90
C	A4=F1 OR F-1	1ADM	91
C	A5=F0	1ADM	92
C	A6=F0	1ADM	93
C	A7=F0	1ADM	94
C	A8=FS4 OR FS0	1ADM	95
C	A9=X0	1ADM	96
C		1ADM	97
	H=8-DT	1ADM	98
C		1ADM	99
C	SET T=T062H OR T=T0-2H	1ADM	100

C		1ADM	101
	DO 190 J=1,M	2ADM	102
190	A(1,J)=A(8,J)-C*(11.0*A(7,J)-82.0*A(6,J)6720.0*A(5,J)61522.0*A(4,J	2ADM	103
	1)61429.0*A(3,J))	1ADM	104
	CALL DERIV(B,A)	1ADM	105
	DO 200 J=1,M	2ADM	106
200	A(5,J)=A(2,J)	2ADM	107
C		1ADM	108
C	A NOW CONTAINS FOR J=1(1)A	1ADM	109
C	A1=X2 OR X-2	1ADM	110
C	A2=F2 OR X-2	1ADM	111
C	A3=F0	1ADM	112
C	A4=F1 CR F-1	1ADM	113
C	A5=F2 CR F-2	1ADM	114
C	A6=F0	1ADM	115
C	A7=F0	1ADM	116
C	A8=FS4 CR FS0	1ADM	117
C	A9=X0	1ADM	118
C		1ADM	119
	B=B-DT	1ADM	120
C		1ADM	121
C	SET T=TC63H OR T=TO-3H	1ADM	122
C		1ADM	123
	DO 210 J=1,M	2ADM	124
210	A(1,J)=A(8,J)6C*(27.0*A(7,J)-610.0*A(6,J)-1632.0*A(5,J)-1374.0*A(4	2ADM	125
	1,J)-1451.0*A(3,J))	1ADM	126
	CALL DERIV(B,A)	1ADM	127
	DO 220 J=1,M	2ADM	128
220	A(6,J)=A(2,J)	2ADM	129
C		1ADM	130
C	A NOW CONTAINS FOR J=1(1)A	1ADM	131
C	A1=X3 OR X-3	1ADM	132
C	A2=F3 OR F-3	1ADM	133
C	A3=F0	1ADM	134
C	A4=F1 OR F-1	1ADM	135
C	A5=F2 OR F-2	1ADM	136
C	A6=F3 OR F-3	1ADM	137
C	A7=F0	1ADM	138
C	A8=FS4 CR FS0	1ADM	139
C	A9=X0	1ADM	140
C		1ADM	141
	B=B-DT	1ADM	142
C		1ADM	143
C	SET T=TC64H OR T=TO-4H	1ADM	144
C		1ADM	145
	DO 230 J=1,M	2ADM	146
230	A(1,J)=A(8,J)-C*(475.0*A(7,J)61902.0*A(6,J)61104.0*A(5,J)61586.0*A	2ADM	147
	1(4,J)61413.0*A(3,J))	1ADM	148
	CALL DERIV(B,A)	1ADM	149
	DO 240 J=1,M	2ADM	150

240 A(7,J)=A(2,J)	2ADM 151
C	1ADM 152
C A NOW CONTAINS FOR J=1(1)A	1ADM 153
C A1=X4 OR X-4	1ADM 154
C A2=F4 OR F-4	1ADM 155
C A3=F0	1ADM 156
C A4=F1 OR F-1	1ADM 157
C A5=F2 OR F-2	1ADM 158
C A6=F3 OR F-3	1ADM 159
C A7=F4 OR F-4	1ADM 160
C A8=FS4 OR FSO	1ADM 161
C A9=X0	1ADM 162
C	1ADM 163
DO 250 J=1,M	2ADM 164
250 A(8,J)=A(9,J)&D*(27.0*A(7,J)-146.0*A(6,J)&336.0*A(5,J)-462.0*A(4,J)	2ADM 165
1)&965.0*A(3,J))	1ADM 166
B=T	1ADM 167
260 CONTINUE	1ADM 168
C	ADM 169
C STATEMENTS 28 THROUGH 38 CONSTITUTE AN ITERATION LOOP (WITH EIGHT	ADM 170
C ITERATIONS) FOR THE FORWARD OR BACKWARD STARTER.	ADM 171
C	ADM 172
C DURING THE ITERATION THE A ARRAY CONTAINS FOR J=1(1)A	ADM 173
C A1=X1,X2,X3, OR X4 -- OR X-1,X-2,X-3, OR X-4	ADM 174
C A2=F1,F2,F3, OR F4 -- OR F-1,F-2,F-3, OR F-4	ADM 175
C A3=F0 (ORIGINAL VALUE)	ADM 176
C A4=F1 OR F-1 (CURRENT VALUE)	ADM 177
C A5=F2 OR F-2 (CURRENT VALUE)	ADM 178
C A6=F3 OR F-3 (CURRENT VALUE)	ADM 179
C A7=F4 OR F-4 (CURRENT VALUE)	ADM 180
C A8=FS4 OR FSO (CURRENT VALUE)	ADM 181
C A9=X0 (ORIGINAL VALUE)	ADM 182
C	ADM 183
C BEGIN CALCULATION OF BACKWARD DIFFERENCES --	ADM 184
C	ADM 185
270 IF (K) 250,280,280	ADM 186
C	ADM 187
C DIFFERENCES FOR FORWARD STARTER --	ADM 188
C	ADM 189
C THE A ARRAY CONTAINS FOR J=1(1)A	ADM 190
C A1=X4	ADM 191
C A2=F4	ADM 192
C A3=F0	ADM 193
C A4=F1	ADM 194
C A5=F2	ADM 195
C A6=F3	ADM 196
C A7=F4	ADM 197
C A8=FS4	ADM 198
C A9=X0	ADM 199
C	ADM 200

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280 DD 320 J=1,M
C
C STEP ONE
C
A(1,J)=A(9,J)
A(2,J)=A(3,J)
DO 290 I=3,6
290 A(I,J)=A(I&1,J)-A(I,J)
C
C STEP TWO
C
DO 300 I=1,3
L=7-I
300 A(L,J)=A(L,J)-A(L-1,J)
C
C STEP THREE
C
A(6,J)=A(6,J)-A(5,J)
A(5,J)=A(5,J)-A(4,J)
C
C STEP FOUR
C
A(6,J)=A(6,J)-A(5,J)
DO 310 I=1,3
L=6-I
310 A(L,J)=A(L,J)-A(L&1,J)
C
C STEP FIVE
C
A(7,J)=A(5,J)-A(6,J)
A(4,J)=A(4,J)-A(7,J)
320 A(5,J)=A(7,J)-A(6,J)

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1ADM 201
1ADM 202
1ADM 203
1ADM 204
1ADM 205
1ADM 206
2ADM 207
2ADM 208
1ADM 209
1ADM 210
1ADM 211
2ADM 212
2ADM 213
2ADM 214
1ADM 215
1ADM 216
1ADM 217
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ADM 240
ADM 241
ADM 242
ADM 243
ADM 244
ADM 245
ADM 246
ADM 247
ADM 248
ADM 249
ADM 250

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C
C THE DIFFERENCES OF F0 HAVE BEEN CONSTRUCTED ACCORDING TO THE
C FOLLOWING TABLE. AN EXAMPLE OF THE NOTATION IS 2D2F3, WHICH MEANS
C THAT THE SECOND ITEM STORED IN THIS COLUMN (INDICATED BY THE FIRST
C DIGIT 2) IS THE SECOND DIFFERENCE (INDICATED BY D2) OF F3. THE
C SECOND COLUMN IS THE DATA THAT WAS IN THE A ARRAY AT THE TIME OF
C COMPLETION OF THE ITERATION. ALL TABLE VALUES ARE FOR J=1(1)N.

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LOC	STEP ONE	STEP TWO	STEP THREE	STEP FOUR	STEP FIVE
A1	X4	1XC			
A2	F4	2FC			
A3	F0	3D1F1		4D1F0	
A4	F1	4D1F2	3D2F2	3D2F1	2D2F0
A5	F2	5D1F3	2D2F3	2D3F2	3D3F0
A6	F3	6D1F4	1D2F4	1D3F4	1D4F0
A7	F4				1D3F1
A8	F54				

C	A9 X0	ADM 251
C		ADM 252
C	NOTE -- IT IS ASSUMED THAT D4F4=D4F3=D4F2=D4F1=D4F0=CONSTANT	ADM 253
C		ADM 254
C	THE A ARRAY NOW CONTAINS FOR J=1(1)N	ADM 255
C	A1=X0	ADM 256
C	A2=F0	ADM 257
C	A3=D1F0	ADM 258
C	A4=D2F0	ADM 259
C	A5=D3F0	ADM 260
C	A6=D4F0	ADM 261
C	A7=D3F1	ADM 262
C	A8=FS4	ADM 263
C	A9=X0	ADM 264
C		ADM 265
C	FS0 WILL NOW BE CALCULATED AND STORED IN A8	ADM 266
C		ADM 267
C	D=-0	ADM 268
C	330 DO 340 J=1,M	1ADM 269
C	340 A(8,J)=A(1,J)&C*(27.0*A(6,J)&C38.0*A(5,J)&C60.0*A(4,J)&C120.0*A(3,J)&C1720.0*A(2,J))	ADM 270
C		ADM 271
C		ADM 272
C	FND OF FORWARD STARTER	ADM 273
C		ADM 274
C	CALL DERIV(T,A)	ADM 275
C	RETURN	ADM 276
C		ADM 277
C	DIFFERENCES FOR BACKWARD STARTER	ADM 278
C		ADM 279
C	350 DO 390 J=1,M	1ADM 280
C		1ADM 281
C	STEP ONE	1ADM 282
C		1ADM 283
C	A(1,J)=A(9,J)	1ADM 284
C	A(2,J)=A(3,J)	1ADM 285
C	DO 360 I=3,6	2ADM 286
C	360 A(I,J)=A(I,J)-A(I&1,J)	2ADM 287
C		1ADM 288
C	STEPS TWO, THREE AND FOUR	1ADM 289
C		1ADM 290
C	DO 380 I=1,3	2ADM 291
C	L=6	2ADM 292
C	LL=I&2	2ADM 293
C	370 A(L,J)=A(L-1,J)-A(L,J)	2ADM 294
C	L=L-1	2ADM 295
C	IF (L-LL) 370,380,370	2ADM 296
C	380 CONTINUE	2ADM 297
C	390 CONTINUE	1ADM 298
C		ADM 299
C	THE DIFFERENCES OF F0 HAVE BEEN COMPUTED ACCORDING TO THE	ADM 300

C	FOLLOWING TABLE. AN EXAMPLE OF THE NOTATION IS 2D2F-1, WHICH					ADM 301
C	MEANS THAT THE SECCND ITEM STORED IN THIS COLUMN (INDICATED BY THE					ADM 302
C	FIRST DIGIT 2) IS THE SECCND DIFFERENCE (INDICATED BY D2) OF F-1.					ADM 303
C	THE SECCND COLUMN IS THE DATA THAT WAS IN THE A ARRAY AT THE TIME					ADM 304
C	OF COMPLETION OF THE ITERATION. ALL VALUES ARE FOR J=1(1)N.					ADM 305
C	LOC.	STEP ONE	STEP TWO	STEP THREE	STEP FOUR	ADM 306
C	A1	X-4	1XC			ADM 307
C	A2	F-4	2FC			ADM 308
C	A3	F0	3D1F0			ADM 309
C	A4	F-1	4D1F-1	3D2FC		ADM 310
C	A5	F-2	5D1F-2	2D2F-1	2D3F0	ADM 311
C	A6	F-3	6D1F-3	1D2F-2	1D3F-1	ADM 312
C	A7	F-4			1D4F0	ADM 313
C	A8	F50				ADM 314
C	A9	X0				ADM 315
C	THE A ARRAY NOW CONTAINS FOR J=1(1)N					ADM 316
C	A1	=X0				ADM 317
C	A2	=F0				ADM 318
C	A3	=D1F0				ADM 319
C	A4	=D2F0				ADM 320
C	A5	=D3F0				ADM 321
C	A6	=D4F0				ADM 322
C	A7	=F-4				ADM 323
C	A8	=F50				ADM 324
C	A9	=X0				ADM 325
C	END OF BACKWARD STARTER					ADM 326
C	GO TO 330					ADM 327
C	BEGIN INTEGRATION WITH THE ADAMS-BASHFORTH PREDICTOR AND THE					ADM 328
C	ADAMS-MCULTON CORRECTOR. AT THIS ENTRY POINT THE A ARRAY CONTAINS					ADM 329
C	FOR J=1(1)N					ADM 330
C	A1	=XI				ADM 331
C	A2	=FI				ADM 332
C	A3	=D1FI				ADM 333
C	A4	=D2FI				ADM 334
C	A5	=D3FI				ADM 335
C	A6	=D4FI				ADM 336
C	A7	=D5FI				ADM 337
C	A8	=FSI				ADM 338
C	A9	=PREDICTED VALUE OF FI FROM THE PREVIOUS INTEGRATION STEP				ADM 339
C	WHERE FI=F(X(ITC&IH),T0&IH), I=1,2,3,....					ADM 340
C	D5FI SHOULD BE NEARLY ZERO AND IS AN INDICATION OF THE ACCURACY					ADM 341
C	OF THE INTFGRATION.					ADM 342
C						ADM 343
C						ADM 344
C						ADM 345
C						ADM 346
C						ADM 347
C						ADM 348
C						ADM 349
C						ADM 350

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C          ADM 351
C          -- A C A M S - B A S T F O R T H   P R E D I C T O R - - - - - ADM 352
C          ADM 353
C          BEGIN PREDICTOR ADM 354
C          ADM 355
400 DO 530 KK=1,K ADM 356
      R=B&DT ADM 357
      DO 420 J=1,M ADM 358
        I=7 ADM 359
410 A(I,J)=A(I-1,J) ADM 360
      I=I-1 ADM 361
      IF (I-2) 410,420,410 ADM 362
420 CONTINUE ADM 363
      D=DT/1440.0 ADM 364
      DO 430 J=1,M ADM 365
430 A(I,J)=A(I,J)&C*(475.0*A(7,J)&502.0*A(6,J)&540.0*A(5,J)&600.0*A(4, ADM 366
      IJ)&720.0*A(3,J)) ADM 367
      CALL DERIV(R,A) ADM 368
      DO 450 J=1,M ADM 369
      DO 440 L=3,7 ADM 370
440 A(L,J)=A(L-1,J)-A(L,J) ADM 371
450 CONTINUE ADM 372
C          ADM 373
C          THE SOLUTIONS X(I&I)=X(10&(I&I)H), DERIVATIVES AND BACKWARD ADM 374
C          DIFFERENCES HAVE BEEN COMPUTED IN THE ORDER INDICATED IN THE ADM 375
C          FOLLOWING TABLE ADM 376
C          ADM 377
C          LOC.          ONE          TWO          THREE          ADM 378
C          ADM 379
C          A1          XI          X(I&I)          ADM 380
C          A2          FI          F(I&I)          ADM 381
C          A3          D1FI          FI          D1F(I&I)          ADM 382
C          A4          D2FI          D1FI          C2F(I&I)          ADM 383
C          A5          D3FI          C2FI          F3F(I&I)          ADM 384
C          A6          D4FI          D3FI          D4F(I&I)          ADM 385
C          A7          D5FI          D4FI          C5F(I&I)          ADM 386
C          A8          FSI          ADM 387
C          ADM 388
C          END PREDICTOR ADM 389
C          ADM 390
C          -- A C A M S - M O U L T I C N   C O R R E C T O R - - - - - ADM 391
C          ADM 392
C          BEGIN CORRECTOR ADM 393
C          ADM 394
C          THE A ARRAY CONTAINS THE FOLLOWING FROM THE PREDICTOR FOR J=1(I) IN ADM 395
C          (THE LEADING P IN THE ENTRIES MEANS PREDICTED VALUE) ADM 396
C          ADM 397
C          A1=PX(I&I) ADM 398
C          A2=PF(I&I) ADM 399
C          A3=PD1F(I&I) ADM 400

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C      A4=PD2F(I&I)      1ADM 401
C      A5=PD3F(I&I)      1ADM 402
C      A6=PD4F(I&I)      1ADM 403
C      A7=PD5F(I&I)      1ADM 404
C      A8=FSI             1ADM 405
C
C      460 DO 470 J=1,N    1ADM 406
C      A(1,J)=A(1,J)&475.0*D*A(7,J)  2ADM 407
C      470 A(9,J)=A(2,J)  2ADM 408
C      CALL DERIV(B,A)    1ADM 409
C      480 DO 500 J=1,N    2ADM 410
C      DELTA=A(2,J)-A(9,J) 2ADM 411
C      DO 490 I=3,7       2ADM 412
C      490 A(I,J)=A(I,J)&DELTA 3ADM 413
C      500 CONTINUE      3ADM 414
C
C      THE CORRECTOR FORMULA HAS NOW BEEN APPLIED TO THE PREDICTED 1ADM 415
C      VALUES, AND THE PREDICTED BACKWARD DIFFERENCES HAVE BEEN ADJUSTED 1ADM 416
C      IN TERMS OF THE CORRECTED VALUES. THE ORDER IN WHICH ALL THIS WAS 1ADM 417
C      DONE IS SHOWN IN THE FOLLOWING TABLE. (THE LEADING P INDICATES 1ADM 418
C      PREDICTED VALUES AND THE LEADING C INDICATES CORRECTED VALUES). 1ADM 419
C      ALL ENTRIES IN THE TABLE ARE FOR J=1(1)N. 1ADM 420
C
C      LOC.          ONE          TWO          THREE          1ADM 421
C      A1  PX(I&I)          1CX(I&I)          1ADM 422
C      A2  PF(I&I)          2CF(I&I)          1ADM 423
C      A3  PD1F(I&I)          1CD1F(I&I)=PD1F(I&I)&DELTA 1ADM 424
C      A4  PD2F(I&I)          2CD2F(I&I)=PD2F(I&I)&DELTA 1ADM 425
C      A5  PD3F(I&I)          3CD3F(I&I)=PD3F(I&I)&DELTA 1ADM 426
C      A6  PD4F(I&I)          4CD4F(I&I)=PD4F(I&I)&DELTA 1ADM 427
C      A7  PD5F(I&I)          5CD5F(I&I)=PD5F(I&I)&DELTA 1ADM 428
C      A8  FSI             1ADM 429
C      A9          PF(I&I)          1ADM 430
C
C      THE LEADING DIGIT IN COLUMNS TWO AND THREE INDICATES THE ORDER IN 1ADM 431
C      WHICH THE ENTRIES WERE STORED. 1ADM 432
C
C      THE A ARRAY NOW CONTAINS FOR J=1(1)N 1ADM 433
C      A1=CX(I&I)=X 1ADM 434
C      A2=CF(I&I)=F 1ADM 435
C      A3=C01F(I&I)=D1F 1ADM 436
C      A4=C02F(I&I)=D2F 1ADM 437
C      A5=C03F(I&I)=D3F 1ADM 438
C      A6=C04F(I&I)=D4F 1ADM 439
C      A7=C05F(I&I)=D5F 1ADM 440
C      A8=FSI 1ADM 441
C
C      END OF PREDICTOR CORRECTOR 1ADM 442
C
C      1ADM 443
C      1ADM 444
C      1ADM 445
C      1ADM 446
C      1ADM 447
C      1ADM 448
C      1ADM 449
C      1ADM 450

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C	COMPUTE FIRST SUM	1ADM 451
510	DO 520 J=1,M	2ADM 452
520	A(8,J)=A(8,J)CH*A(2,J)	2ADM 453
530	CONTINUE	1ADM 454
	T=R	ADM 455
	RETURN	ADM 456
C	ON RETURN- A ARRAY CONTAINS FOR J=1(1)N--	ADM 457
C	A1=X	ADM 458
C	A2=F	ADM 459
C	A3=D1F	ADM 460
C	A4=D2F	ADM 461
C	A5=D3F	ADM 462
C	A6=D4F	ADM 463
C	A7=D5F	ADM 464
C	A8=FS	ADM 465
C		ADM 466
	END	ADM 467

APPENDIX D  
OUTPUT LISTING FOR  
ROTOR RE-ENTRY VEHICLE (REV)







CARD 49 (CONTINUED)

1.345	.860	.558	.310	.295	.270	.240	.1270
.200	.170	.163	.160	.410	.470	.570	.600
.220	.278	.280	.364	1.44	1.05	1.12	.795
.670	.570	.930	1.20	.755	1.12	1.05	1.44
.530	.320	.320	.470	.600	.530	.470	.410
1.20	.930	.970	.670	.250	.285	.329	.375
.364	.280	.238	.220	1.640	.890	.890	.555
.160	.163	.185	.230	.555	1.280	1.280	1.640
.430	.720	.990	1.430	.375	.239	.285	.250
.329	.205	.205	.285	.250	.270	.295	.329
1.430	.990	.720	.430	1.638	1.230	.840	.490
.189	.189	.163	.160	.490	1.230	1.230	1.638
.163	.163	.185	.230	.329	.295	.270	.250
.370	.670	.945	1.400	.220	.240	.270	.295
.295	.205	.205	.270	1.585	1.180	.750	.600
1.400	.545	.670	.370	.400	.750	1.180	1.585
.230	.189	.163	.160	.295	.270	.240	.220
.160	.163	.170	.200	.135	.153	.169	.186
.330	.558	.860	1.345	-.392	-.41	-.567	-.528
.270	.180	.180	.240	.524	.567	.414	.192
1.345	.640	.558	.330	.186	.169	.153	.135
.200	.170	.163	.160	-.059	-.070	-.084	-.099
-.011	-.033	-.085	-.116	-.436	-.476	-.446	-.356
-.200	-.257	-.278	-.260	.356	.446	.476	.356
-.437	-.270	.270	.403	.099	.078	.070	.059
.259	.279	.257	.200	-.045	-.054	-.065	-.075
.116	.066	.033	-.011	-.019	-.028	-.034	-.045
.0045	-.010	-.014	-.047	-.416	-.438	-.374	-.249
-.114	-.186	-.248	-.340	.045	.034	.028	.019
-.244	-.130	.104	.182	-.135	-.153	-.149	-.186
.340	.248	.186	.114	.249	.374	.438	.416
.047	.014	.010	.0045	-.392	-.41	-.567	-.528
0	-.002	-.018	.0045	.065	.065	.054	.045
-.056	-.114	-.223	.002	-.045	-.054	-.065	-.075
-.207	-.104	.104	.182	-.019	-.028	-.034	-.045
.351	.223	.158	.086	-.416	-.438	-.374	-.249
.036	.018	.002	0	.045	.034	.028	.019
.0052	.0046	-.002	-.013	-.135	-.153	-.149	-.186
-.056	-.114	-.185	-.331	.249	.374	.438	.416
.331	.185	.114	.035	-.392	-.41	-.567	-.528
.013	.002	-.005	.0052	.065	.065	.054	.045
-.011	-.033	-.085	-.116	-.019	-.028	-.034	-.045
-.162	-.075	-.278	-.260	-.416	-.438	-.374	-.249
-.200	-.257	-.278	-.260	.045	.034	.028	.019
-.437	-.270	.270	.403	-.135	-.153	-.149	-.186
.299	.279	.257	.200	.249	.374	.438	.416
.116	.066	.033	-.011	-.392	-.41	-.567	-.528
.0045	-.010	-.014	-.047	.065	.065	.054	.045
-.114	-.186	-.248	-.340	-.019	-.028	-.034	-.045
-.244	-.130	.104	.182	-.045	-.054	-.065	-.075
.340	.248	.186	.114	-.045	-.054	-.065	-.075
.047	.014	.010	.0045	-.045	-.054	-.065	-.075
0	-.002	-.018	.0045	-.019	-.028	-.034	-.045
-.056	-.114	-.185	-.331	-.045	-.054	-.065	-.075
-.207	-.104	.104	.182	-.045	-.054	-.065	-.075
.351	.223	.158	.086	-.045	-.054	-.065	-.075
.036	.018	.002	0	-.045	-.054	-.065	-.075
.0052	.0046	-.002	-.013	-.045	-.054	-.065	-.075
-.056	-.114	-.185	-.331	-.045	-.054	-.065	-.075
.331	.185	.114	.035	-.045	-.054	-.065	-.075
.013	.002	-.005	.0052	-.045	-.054	-.065	-.075
-.011	-.033	-.085	-.116	-.045	-.054	-.065	-.075
-.162	-.075	-.278	-.260	-.045	-.054	-.065	-.075
-.200	-.257	-.278	-.260	-.045	-.054	-.065	-.075
-.437	-.270	.270	.403	-.045	-.054	-.065	-.075
.299	.279	.257	.200	-.045	-.054	-.065	-.075
.116	.066	.033	-.011	-.045	-.054	-.065	-.075
.0045	-.010	-.014	-.047	-.045	-.054	-.065	-.075
-.114	-.186	-.248	-.340	-.045	-.054	-.065	-.075
-.244	-.130	.104	.182	-.045	-.054	-.065	-.075
.340	.248	.186	.114	-.045	-.054	-.065	-.075
.047	.014	.010	.0045	-.045	-.054	-.065	-.075
0	-.002	-.018	.0045	-.045	-.054	-.065	-.075
-.056	-.114	-.185	-.331	-.045	-.054	-.065	-.075
-.207	-.106	.106	.182	-.045	-.054	-.065	-.075
.351	.223	.150	.086	-.045	-.054	-.065	-.075
.036	.018	.002	0	-.045	-.054	-.065	-.075
.0052	.0046	-.002	-.013	-.045	-.054	-.065	-.075
-.056	-.114	-.185	-.331	-.045	-.054	-.065	-.075
.331	.185	.114	.035	-.045	-.054	-.065	-.075
.013	.002	-.005	.0052	-.045	-.054	-.065	-.075
-.011	-.033	-.085	-.116	-.045	-.054	-.065	-.075
-.162	-.075	-.278	-.260	-.045	-.054	-.065	-.075
-.200	-.257	-.278	-.260	-.045	-.054	-.065	-.075
-.437	-.270	.270	.403	-.045	-.054	-.065	-.075
.299	.279	.257	.200	-.045	-.054	-.065	-.075
.116	.066	.033	-.011	-.045	-.054	-.065	-.075
.0045	-.010	-.014	-.047	-.045	-.054	-.065	-.075
-.114	-.186	-.248	-.340	-.045	-.054	-.065	-.075
-.244	-.130	.104	.182	-.045	-.054	-.065	-.075
.340	.248	.186	.114	-.045	-.054	-.065	-.075
.047	.014	.010	.0045	-.045	-.054	-.065	-.075
0	-.002	-.018	.0045	-.045	-.054	-.065	-.075
-.056	-.114	-.185	-.331	-.045	-.054	-.065	-.075
-.207	-.106	.106	.182	-.045	-.054	-.065	-.075
.351	.223	.150	.086	-.045	-.054	-.065	-.075
.036	.018	.002	0	-.045	-.054	-.065	-.075
.0052	.0046	-.002	-.013	-.045	-.054	-.065	-.075
-.056	-.114	-.185	-.331	-.045	-.054	-.065	-.075
.331	.185	.114	.035	-.045	-.054	-.065	-.075
.013	.002	-.005	.0052	-.045	-.054	-.065	-.075
-.011	-.033	-.085	-.116	-.045	-.054	-.065	-.075
-.162	-.075	-.278	-.260	-.045	-.054	-.065	-.075
-.200	-.257	-.278	-.260	-.045	-.054	-.065	-.075
-.437	-.270	.270	.403	-.045	-.054	-.065	-.075
.299	.279	.257	.200	-.045	-.054	-.065	-.075
.116	.066	.033	-.011	-.045	-.054	-.065	-.075
.0045	-.010	-.014	-.047	-.045	-.054	-.065	-.075
-.114	-.186	-.248	-.340	-.045	-.054	-.065	-.075
-.244	-.130	.104	.182	-.045	-.054	-.065	-.075
.340	.248	.186	.114	-.045	-.054	-.065	-.075
.047	.014	.010	.0045	-.045	-.054	-.065	-.075
0	-.002	-.018	.0045	-.045	-.054	-.065	-.075
-.056	-.114	-.185	-.331	-.045	-.054	-.065	-.075
-.207	-.106	.106	.182	-.045	-.054	-.065	-.075
.351	.223	.150	.086	-.045	-.054	-.065	-.075
.036	.018	.002	0	-.045	-.054	-.065	-.075
.0052	.0046	-.002	-.013	-.045	-.054	-.065	-.075
-.056	-.114	-.185	-.331	-.045	-.054	-.065	-.075
.331	.185	.114	.035	-.045	-.054	-.065	-.075
.013	.002	-.005	.0052	-.045	-.054	-.065	-.075
-.011	-.033	-.085	-.116	-.045	-.054	-.065	-.075
-.162	-.075	-.278	-.260	-.045	-.054	-.065	-.075
-.200	-.257	-.278	-.260	-.045	-.054	-.065	-.075
-.437	-.270	.270	.403	-.045	-.054	-.065	-.075
.299	.279	.257	.200	-.045	-.054	-.065	-.075
.116	.066	.033	-.011	-.045	-.054	-.065	-.075
.0045	-.010	-.014	-.047	-.045	-.054	-.065	-.075
-.114	-.186	-.248	-.340	-.045	-.054	-.065	-.075
-.244	-.130	.104	.182	-.045	-.054	-.065	-.075
.340	.248	.186	.114	-.045	-.054	-.065	-.075
.047	.014	.010	.0045	-.045	-.054	-.065	-.075
0	-.002	-.018	.0045	-.045	-.054	-.065	-.075
-.056	-.114	-.185	-.331	-.045	-.054	-.065	-.075
-.207	-.106	.106	.182	-.045	-.054	-.065	-.075
.351	.223	.150	.086	-.045	-.054	-.065	-.075
.036	.018	.002	0	-.045	-.054	-.065	-.075
.0052	.0046	-.002	-.013	-.045	-.054	-.065	-.075
-.056	-.114	-.185	-.331	-.045	-.054	-.065	-.075
.331	.185	.114	.035	-.045	-.054	-.065	-.075
.013	.002	-.005	.0052	-.045	-.054	-.065	-.075
-.011	-.033	-.085	-.116	-.045	-.054	-.065	-.075
-.162	-.075	-.278	-.260	-.045	-.054	-.065	-.075
-.200	-.257	-.278	-.260	-.045	-.054	-.065	-.075
-.437	-.270	.270	.403	-.045	-.054	-.065	-.075
.299	.279	.257	.200	-.045	-.054	-.065	-.075
.116	.066	.033	-.011	-.045	-.054	-.065	-.075
.0045	-.010	-.014	-.047	-.045	-.054	-.065	-.075
-.114	-.186	-.248	-.340	-.045	-.054	-.065	-.075
-.244	-.130	.104	.182	-.045	-.054	-.065	-.075
.340	.248	.186	.114	-.045	-.054	-.065	-.075
.047	.014	.010	.0045	-.045	-.054	-.065	-.075
0	-.002	-.018	.0045	-.045	-.054	-.065	-.075
-.056	-.114	-.185	-.331	-.045	-.054	-.065	-.075
-.207	-.106	.106	.182	-.045	-.054	-.065	-.075
.351	.223	.150	.086	-.045	-.054	-.065	-.075
.036	.018	.002	0	-.045	-.054	-.065	-.075
.0052	.0046	-.002	-.013	-.045	-.054	-.065	-.075
-.056	-.114	-.185	-.331	-.045	-.054	-.065	-.075
.331	.185	.114	.035	-.045	-.054	-.065	-.075
.013	.002	-.005	.0052	-.045	-.054	-.065	-.075
-.011	-.033	-.085	-.116	-.045	-.054	-.065	-.075
-.162	-.075	-.278	-.260	-.045	-.054	-.065	-.075
-.200	-.257	-.278	-.260	-.045	-.054	-.065	-.075
-.437	-.270	.270	.403	-.045	-.054	-.065	-.075
.299	.279	.257	.200				

-0.162	-0.075	.075	.142	.249	.374	.438	.416	CARD 50 (CONTINUED)
-0.331	.185	.114	.055	.045	.074	.028	.019	
.013	.002	-.005	.0052					

NOTE: The sample output was obtained using the abbreviated AT62 subroutine and not the complete version.

# SAMPLE OUTPUT

THREE DEGREES OF FREEDOM

## CALCULATION OF INERTIAS

CASE NO.= 1 TEST CASE ALTITUDE=56000 FT

### INPUT DATA FOR OPTIONAL TIME HISTORY

NOPT	NOCYCL	T	TP	Z	ZP	B	BP
3	5	1.00000	0.0	0.0	0.0	0.0	0.0

TIME HISTORY (STABILITY) IS TO BE CALCULATED IN REVS FOR NUMBER OF CYCLES=NOCYCL, ONLY IF NOPT=1 OR NOPT=3

FEATHERING CONTROL SPRING = 50000.00FT.-LB/RAD.

AKTZ = 0.0

TOTAL INERTIA INC. AERO. STATIONS = 10 FIRST AERODYNAMIC STATION NUMBER (ROOT-TO-TIP ORDER) = 3

LAST AERODYNAMIC NUMBER = 9

WREF = 1 -1 (FEATHERING AXIS) OR =2 (LEADING EDGE), AS REFERENCE FROM WHICH CG AND IC ARE MEASURED .

### BLADE PARAMETERS

BLADE RADIUS= 18.75000 FT LAG HINGE OFFSET = 2.16500 FT FLAPPING HINGE OFFSET = 2.16500 FT

BLADE MASS = 11.60400 SLUGS BLADE MOMENT OF INERTIA ABOUT FLAPPING HINGE = 931.840 SL FT SO

BLADE MOMENT OF INERTIA ABOUT FEATHERING AXIS = 0.42480 SL FT SO

## BLADE SECTION PROPERTIES

RADIUS, FT.	CHORD, FT.	F. A., FT.	C. G., FT.	TWIST, DEG.	MASS, SL/FT.	I <sub>C</sub> , SL-FT.
2.1650	2.9420	1.4710	C-C	0.0	1.6460	C-0450
4.5000	2.9420	1.4710	0.0	0.0	1.6460	C-C450
6.6670	2.9420	1.4710	0.0	0.0	0.6600	C-0240
8.3330	2.9420	1.4710	0.0	0.0	0.6600	C-0240
10.4160	2.9420	1.4710	0.0	0.0	0.6600	C-0200
12.5000	2.9420	1.4710	0.0	0.0	0.6600	C-0200
14.5830	2.9420	1.4710	0.0	0.0	0.6600	C-0200
16.6670	2.9420	1.4710	0.0	0.0	0.6600	C-0200
17.9200	2.9420	1.4710	0.0	0.0	0.6600	C-0200
18.7500	2.9420	1.4710	C-C	0.0	0.6600	C-0200

AERODYNAMIC PARAMETERS

Q = 0.893700 CMEGA = 58.4899RAD/SEC ALTITUDE = 96000.  
 AKTB = 0.0 FSPRNG = 0.0 BSPRNG = 0.0 ZSPRNG = 0.0  
 PDAMP = 0.0 PDAMP = 0.0 ZDAMP = 165000.000

STALL FROM UT = 0.0 TC UT = 0.0

PARAMETERS FOR NORMAL-FLCM REGION

MACH NO.	CPD	AC	ALCL	COO	CLAD	CPTAD
0.0	0.124000	0.000100	40.000000	0.105000	0.003900	-0.014300
0.600000	0.124000	0.000500	40.000000	0.105000	0.007900	-0.021400
0.800000	0.124000	0.010250	40.000000	0.105000	0.122300	-0.024600
1.000000	0.124000	0.010250	40.000000	0.105000	0.139800	-0.024700
1.500000	0.114000	0.011300	40.000000	0.130000	0.139800	-0.024300
2.000000	0.114000	0.014670	40.000000	0.130000	0.139800	-0.024700
2.500000	0.114000	0.014670	40.000000	0.130000	0.139800	-0.024300
3.000000	0.114000	0.014670	40.000000	0.130000	0.139800	-0.024300
3.500000	0.114000	0.014670	40.000000	0.130000	0.139800	-0.024300
4.000000	0.114000	0.014670	40.000000	0.130000	0.139800	-0.024700

ROTCOMUTE STABILITY TIME HISTORY

TEST CASE DYNAMIC STABILITY

MACH NUMBER = 3.50

DENSITY = 0.0000399 SL/FT CU

ACC OF GRAVITY = 32.0000 FT/SEC/SEC

ROTOR DATA

ROTOR DIA = 37.50 FT

S8 = 88.01 SL FT

IR = 4000.00 SL FT SC

9R = 6.50 FT

BODY DATA

EDDY MASS = 342.00 SL

BODY DIA = 13.00

BC = 2.66 FT

A = -0.52 FT

IX = 5510.00 SL FT SQ

IY = 5600.00 SL FT SQ

IZ = 7225.00 SL FT SQ

JXZ = 2000.00 SL FT SQ

START TIME = 0.0 SEC

STOP TIME = 50.000 SEC

INCREMENT = 0.100 SEC

AERODYNAMIC DATA

INTERPOLATED DATA

ALPHA	MACH NU 2.500			MACH NU 3.540			MACH NO 3.500			BM 5.993		
	CL	CD	CM	CL	CD	CM	CL	CD	CM	CL	CD	CM
0.0	-0.25900	0.68100	-0.05000	-0.23900	0.63700	-0.04200	-0.23977	0.63869	-0.04231	0.40262	1.30973	-0.03031
70.000	0.44300	1.30300	-0.03800	0.40100	1.31000	-0.03000						

TIME HISTORY  
CYCLE NO. = 1

PSI	T	TP	Z	ZP	B	BP
0.0	1.000E-00	0.0	0.0	0.0	0.0	0.0
15.0	2.244E-01	-5.910E 00	-5.826E-04	-4.451E-03	-1.506E-04	-1.150E-02
30.0	-8.114E-01	-2.018E 00	-1.868E-03	-5.367E-03	-9.457E-04	-8.924E-03
45.0	-4.822E-01	4.232E 00	-2.505E-03	4.964E-04	-2.156E-03	-4.319E-03
60.0	5.457E-01	3.321E 00	-1.873E-03	4.335E-03	-2.573E-03	1.130E-03
75.0	6.107E-01	-2.825E 00	-1.181E-03	9.479E-04	-1.963E-03	3.532E-02
90.0	-2.645E-01	3.861E 00	-1.500E-03	-3.382E-03	-1.489E-03	9.081E-05
105.0	-6.217E-01	1.132E 00	-2.183E-03	-1.840E-03	-1.791E-03	-2.400E-02
120.0	1.773E-02	3.752E 00	-2.699E-03	2.487E-03	-2.044E-03	4.722E-04
135.0	5.483E-01	3.006E-01	-1.128E-03	2.640E-03	-1.435E-03	4.174E-03
150.0	1.699E-01	-3.192E 00	-1.226E-03	-1.100E-03	-3.764E-04	3.916E-03
165.0	-4.262E-01	-1.342E 00	-1.698E-03	-2.506E-03	3.463E-04	1.606E-03
180.0	-2.947E-01	2.368E 00	-1.885E-03	3.186E-04	6.763E-04	9.151E-04
195.0	2.809E-01	2.029E 00	-1.615E-03	2.508E-03	1.022E-03	1.728E-03
210.0	3.577E-01	-1.442E 00	-1.187E-03	7.608E-04	1.518E-03	2.060E-02
225.0	-1.356E-01	-2.327E 00	-1.305E-03	-1.665E-03	1.975E-03	1.430E-03
240.0	-3.685E-01	5.473E-01	-1.652E-03	-9.901E-04	2.229E-03	5.086E-04
255.0	6.682E-03	2.318E 00	-1.638E-03	1.101E-03	2.246E-03	-3.746E-04
270.0	3.410E-01	2.360E-01	-1.337E-03	1.200E-03	2.035E-03	-1.235E-02
285.0	1.011E-01	-2.069E 00	-1.124E-03	-4.959E-04	1.632E-03	-1.848E-03
300.0	-2.842E-01	-8.749E-01	-1.455E-03	-1.114E-03	1.093E-03	-2.271E-03
315.0	-1.871E-01	1.617E 00	-1.544E-03	4.404E-04	4.546E-04	-2.604E-02
330.0	1.986E-01	1.329E 00	-1.273E-03	1.626E-03	-1.983E-04	-2.384E-03
345.0	2.392E-01	-1.019E 00	-1.011E-03	3.731E-04	-7.646E-04	-1.943E-03
360.0	-9.570E-02	-1.539E 00	-1.133E-03	-1.299E-03	-1.301E-03	-2.157E-03

MAXIMUM ABSOLUTE RESPONSE

PSI	T	TP	Z	ZP	B	BP
0.0	1.000E 00	5.910E 00	2.505E-03	5.367E-03	2.573E-03	4.924E-03
15.0						
30.0						
45.0						
60.0						
75.0						
90.0						
105.0						
120.0						
135.0						
150.0						
165.0						
180.0						
195.0						
210.0						
225.0						
240.0						
255.0						
270.0						
285.0						
300.0						
315.0						
330.0						
345.0						
360.0						

NOTE: CYCLES 2 THROUGH 4 INCLUSIVE HAVE BEEN DELETED FOR COMPACTNESS FOR ALL ROTOR BLADE TIME HISTORIES

TIME HISTORY

CYCLE NO. = 5

PSI	T	TP	Z	ZP	B	BP
0.0	-3.177E-04	-2.167E-02	-3.413E-04	1.340E-06	-1.550E-03	1.706E-02
15.0	-4.706E-03	-1.858E-03	-3.409E-04	1.671E-06	-1.032E-03	2.102E-03
30.0	-1.372E-03	7.739E-02	-3.362E-04	3.424E-05	-4.096E-04	2.348E-03
45.0	3.625E-03	1.084E-02	-3.257E-04	4.562E-05	1.544E-04	2.419E-03
60.0	2.379E-03	-2.038E-02	-3.170E-04	2.140E-05	7.688E-04	2.274E-03
75.0	-2.437E-03	-1.643E-02	-3.138E-04	3.010E-06	1.318E-03	1.922E-02
90.0	-2.989E-03	1.220E-02	-3.111E-04	1.743E-05	1.754E-03	1.427E-02
105.0	1.049E-03	1.865E-02	-3.038E-04	3.794E-05	2.053E-03	8.433E-04
120.0	2.964E-03	-4.020E-03	-2.948E-04	3.096E-05	2.189E-03	1.893E-04
135.0	1.486E-04	-1.749E-02	-2.859E-04	9.401E-06	2.148E-03	-5.026E-04
150.0	-2.445E-03	-2.327E-03	-2.874E-04	6.400E-06	1.930E-03	-1.158E-02
165.0	-8.214E-04	1.473E-02	-2.836E-04	2.273E-05	1.559E-03	-1.704E-03
180.0	2.040E-03	7.134E-03	-2.768E-04	2.959E-05	1.056E-03	-2.107E-02
195.0	1.564E-03	-1.077E-02	-2.707E-04	1.640E-05	4.734E-04	-2.344E-03
210.0	-1.180E-03	-1.019E-02	-2.649E-04	5.638E-06	-1.472E-04	-2.397E-03
225.0	-1.702E-03	6.204E-03	-2.594E-04	1.321E-05	-7.561E-04	-2.259E-03
240.0	5.852E-04	1.127E-02	-2.540E-04	2.438E-05	-1.304E-03	-1.930E-03
255.0	1.787E-03	-2.086E-03	-2.445E-04	2.200E-05	-1.746E-03	-1.448E-02
270.0	6.669E-05	-1.109E-02	-2.498E-04	1.291E-05	-2.047E-03	-8.478E-04
285.0	-1.580E-03	-1.529E-03	-2.466E-04	1.206E-05	-2.181E-03	-1.767E-04
300.0	-5.030E-04	9.751E-03	-2.424E-04	1.986E-05	-2.138E-03	5.041E-04
315.0	1.366E-03	4.527E-03	-2.368E-04	2.283E-05	-1.922E-03	1.147E-03
330.0	9.776E-04	-7.494E-03	-2.319E-04	1.456E-05	-1.550E-03	1.656E-03
345.0	-8.891E-04	-6.766E-03	-2.290E-04	7.909E-06	-1.053E-03	2.104E-02
360.0	-1.213E-03	4.290E-03	-2.261E-04	1.359E-05	-4.709E-04	2.342E-03

MAXIMUM ABSOLUTE RESPONSE

PSI	T	TP	Z	ZP	B	BP
15.0	4.706E-03	3.167E-02	3.413E-04	4.562E-05	2.189E-03	2.419E-03
9.0						
0.0						
45.0						
120.0						
45.0						

TEST CASE ALTITUDE=9600 FT

BLADE PARAMETERS

R= 16.75 FT. E= 2.1650 FT. H= 931.83584511G-FT. SC. NO BLADES= 4.

CONDITION  
 MU = 0.8937 LAMBDA(STEADY) = 1.7540 THETA I(COSI) = 0.0 THETA I(SINI) = 0.0  
 THETA O(STEADY) = -4.41

CP FACTOR= 1.0000      CM FACTOR= 1.6000  
AERODYNAMIC PARAMETERS  
TIP SPEED= 1096.69FT/SEC      DENSITY RATIO= 0.017  
SPRING RATES (FT LBS/RAD)  
FEATHERING= 0.0  
LAG= 0.0  
FLAPPING= 0.0  
DAMPING RATES (FT LBS/RAD/SEC)  
FEATHERING= 0.0  
LAG= 16459.9  
FLAPPING= 0.0  
CONTROL SPRING RATES (FT LBS/RAD)  
FEATHERING= 58000.0

ITERATION COUNT=13		LAG ANGLE	
AZIMUTH STA	BETA	THETA	LAG ANGLE
0.0	0.0117	-0.0714	0.0002
15.0	0.0153	-0.0670	0.0003
30.0	0.0187	-0.0626	0.0003
45.0	0.0217	-0.0585	0.0003
60.0	0.0242	-0.0557	0.0003
75.0	0.0255	-0.0527	0.0003
90.0	0.0267	-0.0512	0.0002
105.0	0.0267	-0.0521	0.0001
120.0	0.0257	-0.0545	-0.0001
135.0	0.0239	-0.0585	-0.0002
150.0	0.0212	-0.0622	-0.0003
165.0	0.0182	-0.0663	-0.0004
180.0	0.0148	-0.0705	-0.0005
195.0	0.0112	-0.0741	-0.0005
210.0	0.0078	-0.0762	-0.0005
225.0	0.0046	-0.0771	-0.0004
240.0	0.0020	-0.0774	-0.0004
255.0	0.0001	-0.0779	-0.0003
270.0	-0.0008	-0.0784	-0.0002
285.0	-0.0007	-0.0784	-0.0002
300.0	0.0004	-0.0776	-0.0001
315.0	0.0022	-0.0767	0.0000
330.0	0.0050	-0.0760	0.0001
345.0	0.0082	-0.0745	0.0002

BLADE ANGLE OF ATTACK DISTRIBUTION

PSI	6.667	P.337	15.416	12.500	14.203	16.667	17.920
0.0	74.351	71.562	68.167	64.889	61.745	58.741	57.006
15.0	67.489	64.898	61.756	58.745	55.924	53.233	51.687
30.0	61.603	59.219	56.373	53.616	51.130	48.730	47.356
45.0	57.004	54.824	52.234	49.751	47.452	45.330	44.094
60.0	53.830	51.809	49.414	47.140	45.042	43.053	41.916
75.0	52.066	50.146	47.873	45.736	43.725	41.844	40.767
90.0	51.594	49.712	47.486	45.353	43.428	41.582	40.527
105.0	52.318	50.412	48.158	46.026	44.144	42.173	41.104
120.0	54.257	52.267	49.808	47.666	45.589	43.637	42.516
135.0	57.500	55.368	52.830	50.438	48.166	46.068	44.857
150.0	62.078	59.754	56.980	54.352	51.871	49.532	48.192
165.0	67.877	65.342	62.293	59.385	56.424	54.009	52.508
180.0	74.593	71.868	68.556	65.313	62.305	59.387	57.701
195.0	81.720	78.670	75.361	71.934	68.612	65.498	63.545
210.0	88.584	85.699	82.098	78.525	75.622	71.597	69.557
225.0	94.501	91.652	88.057	84.444	80.848	77.291	75.184
240.0	98.951	96.174	92.635	89.043	85.425	81.619	79.663
255.0	101.662	98.946	95.466	91.512	88.211	84.689	82.514
270.0	102.557	99.866	96.411	92.872	89.279	85.655	83.474
285.0	101.653	98.940	95.461	91.903	88.295	84.662	82.479
300.0	98.978	96.202	92.658	89.024	85.421	81.785	79.609
315.0	94.573	91.717	88.171	84.455	80.823	77.220	75.082
330.0	88.632	85.720	82.077	78.454	74.885	71.392	69.339
345.0	81.647	78.750	75.173	71.671	68.269	64.982	63.065

MACH NUMBER DISTRIBUTION

PSI	6.667	3.333	10.416	12.500	14.583	16.667	17.920
0.0	3.204	2.238	2.291	3.355	3.425	3.514	3.569
15.0	3.308	2.361	3.436	3.522	3.616	3.719	3.764
30.0	3.451	2.519	3.613	3.715	3.825	3.943	4.016
45.0	3.605	2.686	3.793	3.908	4.030	4.158	4.237
60.0	3.744	2.832	3.949	4.073	4.202	4.337	4.421
75.0	3.842	2.935	4.057	4.166	4.320	4.459	4.545
90.0	3.883	2.978	4.102	4.223	4.368	4.509	4.595
105.0	3.862	2.956	4.078	4.207	4.342	4.481	4.567
120.0	3.782	2.871	3.989	4.114	4.244	4.379	4.463
135.0	3.657	2.739	3.848	3.945	4.068	4.216	4.297
150.0	3.510	2.581	3.677	3.782	3.894	4.012	4.087
165.0	3.368	2.424	3.503	3.591	3.686	3.793	3.860
180.0	3.258	2.295	3.352	3.420	3.492	3.586	3.642
195.0	3.195	2.213	3.246	3.290	3.347	3.414	3.459
210.0	3.185	2.189	3.191	3.213	3.246	3.291	3.324
225.0	3.213	2.194	3.181	3.181	3.194	3.219	3.240
240.0	3.258	2.226	3.197	3.180	3.176	3.185	3.192
255.0	3.296	2.256	3.217	3.169	3.174	3.172	3.177
270.0	3.310	2.267	3.224	3.192	3.173	3.167	3.169
285.0	3.293	2.252	3.211	3.182	3.166	3.162	3.166
300.0	3.250	2.216	3.184	3.164	3.157	3.162	3.172
315.0	3.197	2.174	3.157	3.153	3.157	3.163	3.202
330.0	3.157	2.150	3.154	3.171	3.200	3.241	3.271
345.0	3.154	2.167	3.195	3.225	3.287	3.350	3.394

ITER COUNT ON THTS= 1 MEN THTS= -6.4 OLD THTS= -4.4 THRUST= 21024.7 TORQUE= -10.7

TEST CASE ALTITUDE=96000 FT

ITERATION COUNT=13		LAG ANGLE	
AZIMUTH STA	BETA	TWETA	LAG ANGLE
0.0	0.0117	-0.0714	0.0002
15.0	0.0152	-0.0665	0.0003
30.0	0.0187	-0.0626	0.0003
45.0	0.0218	-0.0585	0.0003
60.0	0.0242	-0.0557	0.0003
75.0	0.0255	-0.0527	0.0003
90.0	0.0267	-0.0512	0.0002
105.0	0.0267	-0.0520	0.0001
120.0	0.0257	-0.0549	-0.0001
135.0	0.0239	-0.0585	-0.0002
150.0	0.0212	-0.0622	-0.0003
165.0	0.0182	-0.0662	-0.0004
180.0	0.0148	-0.0705	-0.0005
195.0	0.0112	-0.0740	-0.0005
210.0	0.0078	-0.0762	-0.0005
225.0	0.0046	-0.0770	-0.0005
240.0	0.0020	-0.0774	-0.0004
255.0	0.0001	-0.0779	-0.0003
270.0	-0.0008	-0.0784	-0.0003
285.0	-0.0007	-0.0784	-0.0002
300.0	0.0004	-0.0776	-0.0001
315.0	0.0022	-0.0767	0.0000
330.0	0.0050	-0.0760	0.0001
345.0	0.0082	-0.0745	0.0002

PSI	BLADE ANGLE OF ATTACK DISTRIBUTION			
	10.416	12.500	14.582	16.667
0.0	68.169	64.851	61.746	58.743
15.0	61.757	58.767	55.526	53.235
30.0	56.375	53.678	51.132	48.732
45.0	52.236	49.752	47.493	45.331
60.0	49.416	47.162	45.044	43.054
75.0	47.875	45.737	43.731	41.846
90.0	47.488	45.355	43.430	41.584
105.0	48.160	46.038	44.046	42.175
120.0	49.909	47.688	45.601	43.639
135.0	52.832	50.440	48.188	46.070
150.0	56.982	54.354	51.873	49.534
165.0	62.295	59.387	56.626	54.011
180.0	68.557	65.345	62.307	59.389
195.0	75.363	71.936	68.614	65.410
210.0	82.100	78.551	75.024	71.599
225.0	88.059	84.446	80.850	77.293
240.0	92.637	89.049	85.491	81.821
255.0	95.468	91.913	88.313	84.691
270.0	96.413	92.874	89.281	85.657
285.0	98.322	94.904	90.247	86.664
300.0	98.660	95.056	90.423	87.786
315.0	91.719	84.461	80.625	77.222
330.0	82.079	78.456	74.687	71.394
345.0	75.175	71.673	68.271	64.984

PSI	MACH NUMBER DISTRIBUTION			
	10.416	12.500	14.582	16.667
0.0	3.291	3.355	3.425	3.514
15.0	3.436	3.522	3.616	3.719
30.0	3.613	3.715	3.825	3.943
45.0	3.793	3.908	4.030	4.158
60.0	3.949	4.073	4.202	4.337
75.0	4.057	4.186	4.320	4.459
90.0	4.102	4.233	4.368	4.509
105.0	4.078	4.207	4.342	4.481
120.0	3.989	4.114	4.244	4.379
135.0	3.848	3.965	4.088	4.216
150.0	3.677	3.782	3.894	4.012
165.0	3.503	3.551	3.688	3.793
180.0	3.252	3.420	3.498	3.586
195.0	3.246	3.250	3.347	3.459
210.0	3.191	3.213	3.246	3.414
225.0	3.181	3.181	3.194	3.219
240.0	3.197	3.180	3.176	3.185
255.0	3.217	3.189	3.174	3.172
270.0	3.224	3.192	3.173	3.167
285.0	3.211	3.182	3.166	3.162
300.0	3.216	3.184	3.157	3.172
315.0	3.157	3.154	3.162	3.202
330.0	3.174	3.154	3.162	3.271
345.0	3.157	3.154	3.205	3.350

TORQUE EQUILIBRIUM  
CAPSULE ROM WAVE-ROTOR DISK INTERSECTION HAS NOT BEEN CALCULATED  
BLADE PITCH(TF75) = -4.408 TMAPLST = 21824.996 TORQUE = -3.888

POINTS OF INTERSECTION OF BOW SHOCK WAVE AND PCTCR CISK

AZIMUTH	RADIUS
0.0	0.0
15.0	0.0
30.0	0.0
45.0	0.0
60.0	0.0
75.0	0.0
90.0	0.0
105.0	16.648
120.0	15.039
135.0	13.875
150.0	13.058
165.0	12.646
180.0	12.492
195.0	12.666
210.0	13.092
225.0	13.875
240.0	15.039
255.0	16.648
270.0	0.0
285.0	0.0
300.0	0.0
315.0	0.0
330.0	0.0
345.0	0.0

DENSITY DISTRIBUTION

PSI	RADIAL STATIC, FT				
	10.4160	12.5000	14.5830	16.6670	17.9200
0.0	0.0191	0.0187	0.0181	0.0174	0.0167
15.0	0.0180	0.0174	0.0166	0.0158	0.0150
30.0	0.0166	0.0160	0.0151	0.0142	0.0135
45.0	0.0154	0.0147	0.0139	0.0131	0.0123
60.0	0.0144	0.0138	0.0130	0.0122	0.0115
75.0	0.0139	0.0132	0.0125	0.0117	0.0110
90.0	0.0138	0.0132	0.0124	0.0116	0.0109
105.0	0.0142	0.0135	0.0127	0.0120	0.0112
120.0	0.0150	0.0143	0.0135	0.0127	0.0119
135.0	0.0163	0.0156	0.0147	0.0138	0.0129
150.0	0.0178	0.0171	0.0162	0.0154	0.0145
165.0	0.0195	0.0188	0.0180	0.0172	0.0163
180.0	0.0209	0.0204	0.0197	0.0188	0.0178
195.0	0.0216	0.0214	0.0210	0.0204	0.0197
210.0	0.0217	0.0217	0.0216	0.0212	0.0204
225.0	0.0211	0.0213	0.0213	0.0215	0.0210
240.0	0.0203	0.0207	0.0210	0.0212	0.0213
255.0	0.0195	0.0200	0.0205	0.0208	0.0210
270.0	0.0190	0.0195	0.0201	0.0205	0.0208
285.0	0.0189	0.0194	0.0199	0.0203	0.0205
300.0	0.0192	0.0196	0.0200	0.0202	0.0201
315.0	0.0195	0.0198	0.0200	0.0201	0.0197
330.0	0.0198	0.0199	0.0199	0.0197	0.0185
345.0	0.0198	0.0196	0.0192	0.0188	0.0175

ADVANCE RATIO

PSI	RADIAL STATIC, FT				
	10.4160	12.5000	14.5830	16.6670	17.9200
0.0	0.6940	0.6940	0.6940	0.6940	0.6940
15.0	0.6940	0.6940	0.6940	0.6940	0.6940
30.0	0.6940	0.6940	0.6940	0.6940	0.6940
45.0	0.6940	0.6940	0.6940	0.6940	0.6940
60.0	0.6940	0.6940	0.6940	0.6940	0.6940
75.0	0.6940	0.6940	0.6940	0.6940	0.6940
90.0	0.6940	0.6940	0.6940	0.6940	0.6940
105.0	0.6940	0.6940	0.6940	0.6940	0.6940
120.0	0.6940	0.6940	0.6940	0.6940	0.6940
135.0	0.6940	0.6940	0.6940	0.6940	0.6940
150.0	0.6940	0.6940	0.6940	0.6940	0.6940
165.0	0.6940	0.6940	0.6940	0.6940	0.6940
180.0	0.6940	0.6940	0.6940	0.6940	0.6940
195.0	0.6940	0.6940	0.6940	0.6940	0.6940
210.0	0.6940	0.6940	0.6940	0.6940	0.6940
225.0	0.6940	0.6940	0.6940	0.6940	0.6940
240.0	0.6940	0.6940	0.6940	0.6940	0.6940
255.0	0.6940	0.6940	0.6940	0.6940	0.6940
270.0	0.6940	0.6940	0.6940	0.6940	0.6940
285.0	0.6940	0.6940	0.6940	0.6940	0.6940
300.0	0.6940	0.6940	0.6940	0.6940	0.6940
315.0	0.6940	0.6940	0.6940	0.6940	0.6940
330.0	0.6940	0.6940	0.6940	0.6940	0.6940
345.0	0.6940	0.6940	0.6940	0.6940	0.6940

INFLow DISTRIBUTION

	6.6670	9.3330	10.4160	12.5000	14.5830	16.6670	17.9200
PSI							
0.0	1.3620	1.3620	1.3620	1.3620	1.3620	1.3620	1.3620
15.0	1.3620	1.3620	1.3620	1.3620	1.3620	1.3620	1.3620
30.0	1.3620	1.3620	1.3620	1.3620	1.3620	1.3620	1.3620
45.0	1.3620	1.3620	1.3620	1.3620	1.3620	1.3620	1.3620
60.0	1.3620	1.3620	1.3620	1.3620	1.3620	1.3620	1.3620
75.0	1.3620	1.3620	1.3620	1.3620	1.3620	1.3620	1.3620
90.0	1.3620	1.3620	1.3620	1.3620	1.3620	1.3620	1.3620
105.0	1.3620	1.3620	1.3620	1.3620	1.3620	1.3620	1.3620
120.0	1.3620	1.3620	1.3620	1.3620	1.3620	1.3620	1.3620
135.0	1.3620	1.3620	1.3620	1.3620	1.3620	1.3620	1.3620
150.0	1.3620	1.3620	1.3620	1.3620	1.3620	1.3620	1.3620
165.0	1.3620	1.3620	1.3620	1.3620	1.3620	1.3620	1.3620
180.0	1.3620	1.3620	1.3620	1.3620	1.3620	1.3620	1.3620
195.0	1.3620	1.3620	1.3620	1.3620	1.3620	1.3620	1.3620
210.0	1.3620	1.3620	1.3620	1.3620	1.3620	1.3620	1.3620
225.0	1.3620	1.3620	1.3620	1.3620	1.3620	1.3620	1.3620
240.0	1.3620	1.3620	1.3620	1.3620	1.3620	1.3620	1.3620
255.0	1.3620	1.3620	1.3620	1.3620	1.3620	1.3620	1.3620
270.0	1.3620	1.3620	1.3620	1.3620	1.3620	1.3620	1.3620
285.0	1.3620	1.3620	1.3620	1.3620	1.3620	1.3620	1.3620
300.0	1.3620	1.3620	1.3620	1.3620	1.3620	1.3620	1.3620
315.0	1.3620	1.3620	1.3620	1.3620	1.3620	1.3620	1.3620
330.0	1.3620	1.3620	1.3620	1.3620	1.3620	1.3620	1.3620
345.0	1.3620	1.3620	1.3620	1.3620	1.3620	1.3620	1.3620

TYPE HISTCRY  
CYCLE NO. = 1

PSI	T	TP	Z	ZP	B	RP
0.0	1.000E-00	0.0	0.0	0.0	0.0	0.0
15.0	2.145E-01	-6.001E-00	-4.138E-04	-3.161E-03	-1.658E-04	-1.267E-03
30.0	-8.408E-01	-2.061E-00	-1.337E-03	-3.893E-03	-8.868E-04	-4.242E-03
45.0	-4.831E-01	4.793E-00	-1.850E-03	-2.147E-05	-1.904E-03	-3.532E-03
60.0	6.084E-01	3.546E-00	-1.527E-03	2.484E-03	-2.318E-03	3.744E-04
75.0	6.544E-01	-3.155E-00	-1.133E-03	5.292E-04	-2.015E-03	1.939E-03
90.0	-3.364E-01	-4.374E-00	-1.324E-03	-1.991E-03	-1.790E-03	-2.260E-04
105.0	-7.224E-01	1.426E-00	-1.685E-03	-1.655E-03	-2.012E-03	-1.462E-03
120.0	5.230E-02	4.493E-00	-1.468E-03	2.426E-03	-2.010E-03	1.476E-03
135.0	6.735E-01	2.523E-01	-8.540E-04	2.262E-03	-1.167E-03	4.962E-03
150.0	1.871E-01	-3.968E-00	-7.500E-04	-1.467E-03	4.125E-05	4.267E-03
165.0	-5.600E-01	-1.586E-00	-1.312E-03	-2.826E-03	7.851E-04	1.416E-02
180.0	-3.529E-01	2.015E-00	-1.615E-03	5.140E-04	1.058E-03	6.686E-04
195.0	3.632E-01	2.455E-00	-1.146E-03	3.067E-03	1.375E-03	1.754E-03
210.0	4.400E-01	-1.868E-00	-6.412E-04	7.876E-04	1.886E-03	2.149E-03
225.0	-1.778E-01	-2.852E-00	-8.388E-04	-2.297E-03	2.331E-03	1.248E-03
240.0	-4.556E-01	7.298E-01	-1.323E-03	-1.409E-03	2.496E-03	1.334E-05
255.0	1.366E-02	2.855E-00	-1.327E-03	1.371E-03	2.378E-03	-9.124E-04
270.0	4.234E-01	2.747E-01	-9.412E-04	1.579E-03	2.061E-03	-1.509E-03
285.0	1.262E-01	-2.545E-00	-8.147E-04	-0.122E-04	1.593E-03	-2.055E-03
300.0	-3.501E-01	-1.093E-00	-1.093E-03	-1.514E-03	9.703E-04	-2.713E-02
315.0	-2.346E-01	1.575E-00	-1.250E-03	3.164E-04	2.240E-04	-2.988E-03
330.0	2.414E-01	1.660E-00	-9.672E-04	1.842E-03	-4.818E-04	-2.404E-03
345.0	2.969E-01	-1.237E-00	-6.494E-04	5.857E-04	-1.038E-03	-1.844E-03
360.0	-1.179E-01	-1.932E-00	-7.329E-04	-1.224E-03	-1.566E-03	-2.194E-03

MAXIMUM ABSOLUTE RESPONSE

PSI	T	TP	Z	ZP	B	RP
0.0	1.000E-00	0.0	0.0	0.0	0.0	0.0
15.0	1.000E-00	6.601E-00	1.850E-03	3.893E-03	2.496E-03	4.962E-03
45.0						
90.0						
135.0						

TIME HISTORY

CYCLE NO. = 5

PSI	T	TP	Z	ZP	B	BP
0.0	-6.056E-04	-7.475E-02	-2.571E-04	-1.710E-05	-1.427E-03	2.062E-02
15.0	-1.117E-02	-4.926E-03	-2.622E-04	-2.186E-05	-8.439E-04	2.389E-03
30.0	-3.281E-03	6.616E-02	-2.810E-04	3.098E-05	-1.933E-04	2.366E-03
45.0	9.064E-03	2.814E-02	-2.583E-04	5.122E-05	4.755E-04	2.559E-03
60.0	6.049E-03	-5.117E-02	-2.414E-04	1.686E-05	1.112E-03	2.307E-03
75.0	-6.348E-03	4.354E-02	-2.404E-04	-9.833E-06	1.654E-03	1.833E-02
90.0	-7.821E-03	2.228E-02	-2.464E-04	1.001E-05	2.056E-03	1.235E-03
105.0	3.091E-03	5.168E-02	-2.235E-04	4.301E-05	2.294E-03	5.843E-04
120.0	8.219E-03	-1.190E-02	-2.236E-04	3.287E-05	2.355E-03	-1.195E-04
135.0	1.111E-04	-5.004E-02	-2.206E-04	-1.034E-05	2.226E-03	-8.654E-04
150.0	-7.258E-03	6.248E-03	-1.240E-04	1.526E-05	1.910E-03	-1.552E-03
165.0	-2.465E-03	4.286E-02	-2.224E-04	2.778E-05	1.435E-03	-2.073E-03
180.0	5.800E-03	2.329E-02	-2.127E-04	4.633E-05	8.491E-04	-2.403E-03
195.0	4.320E-03	-3.160E-02	-2.052E-04	1.075E-05	1.988E-04	-2.529E-03
210.0	-3.628E-03	-2.912E-02	-2.054E-04	-2.001E-05	-4.676E-04	-2.529E-03
225.0	-5.015E-03	1.853E-02	-2.087E-04	2.127E-06	-1.098E-03	-2.290E-02
240.0	1.681E-03	3.262E-02	-2.037E-04	3.629E-05	-1.641E-03	-1.857E-03
255.0	5.151E-03	-6.114E-03	-1.931E-04	2.945E-05	-2.051E-03	-1.271E-03
270.0	1.585E-04	-3.203E-02	-1.912E-04	7.281E-06	-2.294E-03	-5.848E-04
285.0	-4.673E-03	4.881E-03	-1.917E-04	-4.039E-06	-2.351E-03	1.465E-04
300.0	-1.663E-03	2.787E-02	-1.856E-04	2.035E-05	-2.218E-03	8.678E-04
315.0	3.775E-03	1.367E-02	-1.827E-04	3.229E-05	-1.905E-03	1.523E-03
330.0	2.820E-03	-2.056E-02	-1.769E-04	1.150E-05	-1.437E-03	2.051E-03
345.0	-2.501E-03	-1.968E-02	-1.763E-04	-6.969E-06	-8.542E-04	2.404E-03
360.0	-3.476E-03	1.223E-02	-1.766E-04	5.275E-06	-2.038E-04	2.565E-03

MAXIMUM ABSOLUTE RESPONSE

PSI	T	TP	Z	ZP	B	BP
15.0	1.117E-02	7.475E-02	2.622E-04	5.122E-05	2.355E-03	2.566E-03
0.0						
15.0						
45.0						
120.0						
30.0						

TEST CASE ALTITUDE=56000 FT

BLADE PARAMETERS

R= 18.75 FT. E= 2.1650 FT. II= 931.839845116-FT. SG. NO BLADES= 4.

CONDITION  
 MU = 0.7217 LAPC(AI STEADY)= 1.4165 THETA I(COSI)= 0.0 THETA I(SINI)= 0.0  
 THETA O(STEADY)= -4.41

CP FACTOR= 1.0000      CH FACTOR= 1.0000  
AERODYNAMIC PARAMETERS  
TIP SPEED= 1096.69FT/SEC      DENSITY RATIO= 0.017  
SPRING RATES (FT LBS/RAD)  
FEATHERING= 0.0  
LAG= 0.0  
FLAPPING= 0.0  
DAMPING RATES (FT LBS/RAD/SEC)  
FEATHERING= 0.0  
LAG= 16459.9  
FLAPPING= 0.0  
CONTROL SPRING RATES (FT LBS/RAD)  
FEATHERING= 58000.0

ITERATION COUNT= 8		BETA	THETA	LAG ANGLE
AZIMUTH STA				
0.0	-0.0021	-0.0711	0.0006	
15.0	-0.0018	-0.0687	0.0006	
30.0	-0.0007	-0.0658	0.0006	
45.0	0.0012	-0.0643	0.0006	
50.0	0.0036	-0.0641	0.0006	
75.0	0.0662	-0.0639	0.0006	
90.0	0.0090	-0.0631	0.0005	
105.0	0.0117	-0.0612	0.0005	
120.0	0.0142	-0.0585	0.0004	
135.0	0.0164	-0.0556	0.0004	
150.0	0.0182	-0.0638	0.0003	
165.0	0.0192	-0.0678	0.0003	
180.0	0.0202	-0.0655	0.0003	
195.0	0.0202	-0.0716	0.0003	
210.0	0.0195	-0.0745	0.0003	
225.0	0.0181	-0.0772	0.0003	
240.0	0.0160	-0.0773	0.0004	
255.0	0.0134	-0.0759	0.0004	
270.0	0.0101	-0.0755	0.0004	
285.0	0.0075	-0.0766	0.0005	
300.0	0.0045	-0.0765	0.0005	
315.0	0.0015	-0.0755	0.0005	
330.0	-0.0002	-0.0736	0.0006	
345.0	-0.0015	-0.0724	0.0006	

BLADE ANGLE OF ATTACK DISTRIBUTION

PSI	6.667	8.332	10.416	12.500	14.583	16.667	17.920
0.0	71.293	67.657	63.745	59.858	56.215	52.816	50.691
15.0	64.606	61.439	57.693	54.191	50.536	47.918	46.216
30.0	58.912	56.028	52.645	49.502	46.556	43.912	42.399
45.0	54.404	51.770	48.654	45.847	43.220	40.797	39.431
60.0	51.169	48.723	45.872	43.228	40.810	38.571	37.309
75.0	49.274	46.943	44.228	41.722	39.412	37.291	36.080
90.0	48.718	46.426	43.758	41.255	39.025	36.930	35.749
105.0	49.503	47.174	44.462	41.958	39.659	37.647	36.364
120.0	51.602	49.160	46.313	43.683	41.257	39.146	37.808
135.0	54.851	52.225	49.154	46.312	43.885	41.502	40.502
150.0	59.227	56.355	52.982	49.847	47.584	45.209	43.848
165.0	64.834	61.689	57.960	54.469	51.467	49.058	47.654
180.0	71.509	68.096	64.007	60.376	57.352	54.844	52.235
195.0	78.618	75.012	70.527	66.416	62.768	60.158	57.644
210.0	85.381	81.685	77.118	72.658	68.759	66.118	63.574
225.0	91.210	87.517	82.885	78.251	74.246	71.732	69.178
240.0	95.733	92.092	87.473	82.834	78.240	75.728	73.224
255.0	99.620	95.031	90.446	85.805	81.173	78.319	75.705
270.0	99.597	96.026	91.454	86.813	82.165	79.228	76.544
285.0	98.608	95.009	90.413	85.761	81.118	78.177	75.485
300.0	95.791	92.131	87.491	82.821	78.217	75.204	72.842
315.0	91.321	87.602	82.941	78.319	73.801	70.841	68.894
330.0	85.406	81.681	77.081	72.553	68.271	64.147	61.775
345.0	78.485	74.851	70.436	66.201	62.182	58.397	56.238

MACH NUMBER DISTRIBUTION

PSI	6.667	8.332	10.416	12.500	14.583	16.667	17.920
0.0	2.542	2.588	2.657	2.735	2.832	2.937	3.005
15.0	2.641	2.703	2.792	2.853	2.925	3.022	3.198
30.0	2.763	2.840	2.945	3.059	3.182	3.313	3.395
45.0	2.889	2.972	3.093	3.218	3.350	3.489	3.575
60.0	2.997	3.091	3.216	3.348	3.487	3.631	3.720
75.0	3.071	3.169	3.298	3.424	3.576	3.724	3.815
90.0	3.098	3.197	3.328	3.466	3.605	3.757	3.849
105.0	3.075	3.173	3.302	3.438	3.580	3.732	3.849
120.0	3.006	3.100	3.224	3.356	3.494	3.642	3.775
135.0	2.902	2.988	3.104	3.229	3.366	3.513	3.653
150.0	2.779	2.855	2.959	3.073	3.197	3.332	3.463
165.0	2.660	2.721	2.810	2.909	3.012	3.120	3.229
180.0	2.563	2.607	2.675	2.743	2.812	2.882	2.954
195.0	2.502	2.527	2.573	2.623	2.673	2.723	2.774
210.0	2.480	2.486	2.509	2.548	2.585	2.622	2.659
225.0	2.488	2.478	2.481	2.500	2.517	2.534	2.551
240.0	2.510	2.488	2.475	2.479	2.468	2.458	2.448
255.0	2.530	2.501	2.478	2.472	2.462	2.452	2.442
270.0	2.537	2.505	2.479	2.469	2.459	2.449	2.439
285.0	2.524	2.495	2.473	2.466	2.456	2.446	2.436
300.0	2.498	2.477	2.464	2.464	2.464	2.464	2.464
315.0	2.471	2.462	2.466	2.485	2.520	2.571	2.608
330.0	2.460	2.469	2.491	2.531	2.583	2.654	2.701
345.0	2.481	2.507	2.554	2.615	2.690	2.777	2.835

PSI COUNT ON INT5= 1      NEW INT5= -4.1      OLD INT5= -4.4      THRUST= 15291.0      TORQUE= -1653.9

TEST CASE      ALTITUDE=5000 FT

ITERATION COUNT=16		BETA	THETA	LAG ANGLE
AZIMUTH STA				
0.0	-0.0022	-0.0654	0.0004	
15.0	-0.0018	-0.0630	0.0004	
30.0	-0.0006	-0.0602	0.0004	
45.0	0.0012	-0.0586	0.0004	
60.0	0.0037	-0.0584	0.0003	
75.0	0.0064	-0.0581	0.0003	
90.0	0.0092	-0.0573	0.0003	
105.0	0.0119	-0.0555	0.0002	
120.0	0.0144	-0.0533	0.0002	
135.0	0.0166	-0.0540	0.0001	
150.0	0.0184	-0.0582	0.0001	
165.0	0.0196	-0.0622	0.0000	
180.0	0.0202	-0.0643	0.0000	
195.0	0.0202	-0.0661	0.0000	
210.0	0.0196	-0.0690	0.0000	
225.0	0.0181	-0.0715	0.0001	
240.0	0.0160	-0.0717	0.0001	
255.0	0.0132	-0.0703	0.0001	
270.0	0.0104	-0.0699	0.0001	
285.0	0.0074	-0.0709	0.0002	
300.0	0.0044	-0.0712	0.0002	
315.0	0.0018	-0.0695	0.0003	
330.0	-0.0003	-0.0680	0.0003	
345.0	-0.0016	-0.0668	0.0003	

PSI		MACH NUMBER		BLADE ANGLE OF ATTACK DISTRIBUTION		RACIAL STA.		RACIAL STA.		RACIAL STA.	
0.0	6.667	8.333	10.416	12.500	14.583	16.667	17.920	16.667	17.920	16.667	17.920
5.0	71.626	68.189	64.076	60.189	56.544	53.145	51.219	53.145	51.219	53.145	51.219
10.0	64.938	61.770	58.024	54.521	51.265	48.247	46.543	48.247	46.543	48.247	46.543
15.0	59.241	56.357	52.972	49.829	46.922	44.237	42.723	44.237	42.723	44.237	42.723
20.0	54.732	52.097	49.020	46.172	43.545	41.121	39.755	41.121	39.755	41.121	39.755
25.0	51.499	49.052	46.201	43.566	41.138	38.898	37.636	38.898	37.636	38.898	37.636
30.0	49.066	47.274	44.559	42.023	39.743	37.611	36.410	37.611	36.410	37.611	36.410
35.0	49.038	46.756	44.088	41.625	39.355	37.260	36.079	37.260	36.079	37.260	36.079
40.0	49.829	47.500	44.787	42.283	39.575	41.772	40.689	41.772	40.689	41.772	40.689
45.0	51.921	49.479	46.633	44.002	41.577	43.466	42.328	43.466	42.328	43.466	42.328
50.0	55.168	52.541	49.472	46.630	48.202	46.051	44.820	46.051	44.820	46.051	44.820
55.0	59.545	56.674	53.301	50.167	51.503	49.529	48.168	49.529	48.168	49.529	48.168
60.0	65.157	62.007	58.279	54.789	56.727	54.078	52.555	54.078	52.555	54.078	52.555
65.0	71.822	68.410	64.322	63.650	62.657	59.662	57.960	59.662	57.960	59.662	57.960
70.0	78.927	75.321	70.937	66.727	69.676	65.860	63.986	65.860	63.986	65.860	63.986
75.0	85.692	81.996	77.429	72.970	75.471	72.044	70.091	72.044	70.091	72.044	70.091
80.0	91.527	87.824	83.202	78.659	81.193	77.645	75.542	77.645	75.542	77.645	75.542
85.0	96.054	92.412	87.794	83.155	78.561	82.175	80.027	82.175	80.027	82.175	80.027
90.0	98.942	95.352	90.768	86.127	81.495	85.141	82.976	85.141	82.976	85.141	82.976
95.0	99.921	96.350	91.778	87.138	82.494	87.902	85.190	87.902	85.190	87.902	85.190
100.0	98.936	95.337	90.741	86.090	81.447	86.869	84.172	86.869	84.172	86.869	84.172
105.0	96.122	92.463	87.822	83.162	78.545	84.035	81.392	84.035	81.392	84.035	81.392
110.0	91.650	87.932	83.270	78.649	74.130	69.760	67.223	69.760	67.223	69.760	67.223
115.0	95.733	82.008	77.408	72.920	68.597	64.473	62.101	64.473	62.101	64.473	62.101
120.0	78.814	75.180	70.764	66.529	62.965	58.723	56.564	58.723	56.564	58.723	56.564
125.0	6.667	8.333	10.416	12.500	14.583	16.667	17.920	16.667	17.920	16.667	17.920
130.0	2.542	2.587	2.657	2.739	2.832	2.937	3.005	2.937	3.005	2.937	3.005
135.0	2.641	2.703	2.792	2.862	2.902	2.922	2.919	2.922	2.919	2.922	2.919
140.0	2.763	2.839	2.944	3.059	3.182	3.312	3.394	3.312	3.394	3.312	3.394
145.0	2.889	2.976	3.092	3.217	3.350	3.489	3.575	3.489	3.575	3.489	3.575
150.0	2.997	3.091	3.216	3.348	3.486	3.631	3.720	3.631	3.720	3.631	3.720
155.0	3.071	3.169	3.298	3.434	3.576	3.724	3.815	3.724	3.815	3.724	3.815
160.0	3.098	3.197	3.328	3.466	3.609	3.757	3.849	3.757	3.849	3.757	3.849
165.0	3.076	3.172	3.302	3.436	3.580	3.728	3.821	3.728	3.821	3.728	3.821
170.0	2.902	2.988	3.105	3.229	3.356	3.494	3.581	3.494	3.581	3.494	3.581
175.0	2.780	2.855	2.960	3.074	3.174	3.290	3.377	3.290	3.377	3.290	3.377
180.0	2.660	2.722	2.810	2.909	2.972	3.075	3.141	3.075	3.141	3.075	3.141
185.0	2.563	2.608	2.676	2.744	2.789	2.874	2.920	2.874	2.920	2.874	2.920
190.0	2.502	2.528	2.573	2.633	2.678	2.744	2.775	2.744	2.775	2.744	2.775
195.0	2.480	2.487	2.510	2.548	2.581	2.630	2.654	2.630	2.654	2.630	2.654
200.0	2.463	2.478	2.481	2.500	2.508	2.526	2.527	2.526	2.527	2.526	2.527
205.0	2.510	2.488	2.475	2.479	2.468	2.466	2.454	2.466	2.454	2.466	2.454
210.0	2.530	2.501	2.478	2.472	2.482	2.482	2.482	2.482	2.482	2.482	2.482
215.0	2.537	2.503	2.479	2.469	2.476	2.498	2.519	2.498	2.519	2.498	2.519
220.0	2.524	2.493	2.473	2.466	2.476	2.503	2.526	2.503	2.526	2.503	2.526
225.0	2.499	2.477	2.464	2.468	2.488	2.524	2.552	2.524	2.552	2.524	2.552
230.0	2.472	2.452	2.466	2.485	2.520	2.571	2.608	2.571	2.608	2.571	2.608
235.0	2.460	2.468	2.491	2.521	2.585	2.654	2.701	2.654	2.701	2.654	2.701
240.0	2.481	2.507	2.554	2.615	2.690	2.777	2.835	2.777	2.835	2.777	2.835

1 PER COUNT ON TMTS= 2    NEW TMTS= -3.8    OLD TMTS= -4.1    THRUST= 15325.4    TORQUE= -766.0

TEST CASE    ALTITUDE=9000 FT

ITERATION COUNT=16		LAG ANGLE	
AZIMUTH STA	BEVA	THETA	LAG ANGLE
0.0	-0.0022	-0.0603	0.0001
15.0	-0.0018	-0.0579	0.0001
30.0	-0.0005	-0.0551	0.0001
45.0	0.0014	-0.0536	0.0001
60.0	0.0038	-0.0533	0.0001
75.0	0.0065	-0.0530	0.0000
90.0	0.0093	-0.0521	0.0000
105.0	0.0120	-0.0504	-0.0000
120.0	0.0142	-0.0483	-0.0001
135.0	0.0167	-0.0491	-0.0001
150.0	0.0185	-0.0531	-0.0002
165.0	0.0197	-0.0571	-0.0002
180.0	0.0204	-0.0593	-0.0002
195.0	0.0202	-0.0611	-0.0002
210.0	0.0195	-0.0639	-0.0002
225.0	0.0180	-0.0663	-0.0002
240.0	0.0155	-0.0665	-0.0002
255.0	0.0133	-0.0651	-0.0001
270.0	0.0102	-0.0648	-0.0001
285.0	0.0072	-0.0657	-0.0001
300.0	0.0042	-0.0660	-0.0000
315.0	0.0017	-0.0647	-0.0000
330.0	-0.0004	-0.0625	0.0000
345.0	-0.0017	-0.0617	0.0001

BLADE ANGLE OF ATTACK DISTRIBUTION  
RACIAL STA.

PSI	6.667	8.333	10.416	12.500	14.583	16.667	17.920
0.0	71.925	68.488	64.374	60.486	56.841	53.441	51.515
15.0	65.236	62.068	58.321	54.817	51.560	48.542	46.838
30.0	59.535	56.650	53.265	50.121	47.214	44.528	43.014
45.0	55.023	52.388	49.310	46.462	43.834	41.410	40.044
60.0	51.792	49.345	46.454	43.858	41.429	39.189	37.927
75.0	49.901	47.569	44.854	42.347	40.037	37.906	36.704
90.0	49.343	47.051	44.382	41.919	39.645	37.554	36.373
105.0	49.118	47.788	45.077	42.573	40.265	38.179	36.979
120.0	52.204	49.788	46.916	44.266	41.861	39.750	38.612
135.0	55.450	52.788	49.755	46.914	44.486	42.335	41.105
150.0	59.833	57.071	53.590	50.456	48.192	46.018	44.457
165.0	65.445	63.296	58.568	55.079	52.017	49.369	47.846
180.0	72.106	68.694	64.606	60.575	57.093	54.948	53.266
195.0	79.207	75.602	71.218	67.008	63.260	60.142	58.268
210.0	87.977	82.281	77.714	73.256	69.756	66.142	64.268
225.0	91.819	88.126	83.495	78.901	75.485	71.938	70.318
240.0	96.348	92.706	88.088	83.450	78.856	75.469	73.821
255.0	99.234	95.644	91.360	86.419	81.787	78.533	76.868
270.0	100.214	96.642	92.070	87.430	82.786	79.194	77.483
285.0	99.233	95.635	91.039	86.387	81.744	77.166	75.469
300.0	96.423	92.764	88.123	83.464	78.850	74.337	71.693
315.0	91.950	88.232	83.571	78.949	74.430	70.060	67.523
330.0	86.031	82.306	77.705	73.217	68.894	64.769	62.397
345.0	79.112	75.477	71.061	66.825	62.803	59.018	56.858

MACH NUMBER DISTRIBUTION  
RACIAL STA.

PSI	6.667	8.333	10.416	12.500	14.583	16.667	17.920
0.0	2.542	2.587	2.656	2.738	2.832	2.937	3.004
15.0	2.641	2.703	2.792	2.892	3.002	3.121	3.197
30.0	2.763	2.839	2.944	3.059	3.181	3.312	3.394
45.0	2.889	2.975	3.092	3.217	3.349	3.488	3.575
60.0	2.997	3.091	3.215	3.348	3.486	3.630	3.720
75.0	3.071	3.169	3.298	3.434	3.576	3.723	3.815
90.0	3.098	3.197	3.328	3.466	3.605	3.757	3.849
105.0	3.076	3.173	3.303	3.439	3.581	3.736	3.828
120.0	3.007	3.100	3.225	3.356	3.495	3.654	3.746
135.0	2.902	2.989	3.105	3.230	3.367	3.536	3.628
150.0	2.780	2.856	2.960	3.074	3.194	3.374	3.466
165.0	2.660	2.722	2.810	2.910	3.023	3.156	3.248
180.0	2.563	2.608	2.676	2.763	2.860	3.000	3.092
195.0	2.502	2.528	2.573	2.634	2.706	2.854	2.946
210.0	2.480	2.487	2.510	2.548	2.600	2.758	2.850
225.0	2.488	2.478	2.481	2.500	2.532	2.690	2.782
240.0	2.510	2.488	2.475	2.479	2.488	2.646	2.738
255.0	2.530	2.501	2.478	2.472	2.482	2.640	2.732
270.0	2.537	2.505	2.479	2.469	2.476	2.634	2.726
285.0	2.524	2.495	2.473	2.466	2.476	2.628	2.720
300.0	2.499	2.477	2.464	2.468	2.480	2.622	2.714
315.0	2.472	2.462	2.466	2.485	2.488	2.616	2.708
330.0	2.460	2.468	2.491	2.521	2.525	2.600	2.692
345.0	2.481	2.507	2.554	2.615	2.689	2.777	2.835

ITER COUNT ON TH75= 3      NEM TH75= -3.6      OLD TH75= -3.6      THRUST= 15354.3      TORQUE= 40.2

TEST CASE      ALTITUDE=96000 FT

ITERATION COUNT=17	BETA	THETA	LAG ANGLE
AZIMUTH STA			
0.0	-0.0022	-0.0604	0.0001
15.0	-0.0019	-0.0580	0.0001
30.0	-0.0035	-0.0532	0.0001
45.0	0.0014	-0.0537	0.0001
50.0	0.0038	-0.0534	0.0001
75.0	0.0065	-0.0521	0.0000
90.0	0.0093	-0.0523	0.0000
105.0	0.0120	-0.0505	-0.0000
120.0	0.0145	-0.0485	-0.0001
135.0	0.0167	-0.0492	-0.0001
150.0	0.0185	-0.0532	-0.0002
165.0	0.0197	-0.0572	-0.0002
180.0	0.0204	-0.0594	-0.0002
195.0	0.0203	-0.0612	-0.0002
210.0	0.0195	-0.0640	-0.0002
225.0	0.0180	-0.0665	-0.0002
240.0	0.0155	-0.0666	-0.0002
255.0	0.0132	-0.0653	-0.0001
270.0	0.0102	-0.0645	-0.0001
285.0	0.0072	-0.0658	-0.0001
300.0	0.0042	-0.0662	-0.0000
315.0	0.0017	-0.0649	0.0000
330.0	-0.0004	-0.0631	0.0000
345.0	-0.0017	-0.0618	0.0001

BLADE ANGLE OF ATTACK DISTRIBUTION

PSI	6.667	8.333	10.416	12.500	14.583	16.667	17.920
0.0	71.918	68.681	64.367	60.053	56.739	53.424	51.507
15.0	65.229	62.061	58.313	54.810	51.553	48.534	46.831
30.0	59.527	56.643	53.258	50.114	47.207	44.521	43.007
45.0	55.016	52.381	49.373	46.455	43.827	41.403	40.037
60.0	51.785	49.338	46.986	43.851	41.422	39.182	37.920
75.0	49.894	47.562	44.847	42.340	40.030	37.898	36.697
90.0	49.336	47.044	44.375	41.912	39.642	37.547	36.366
105.0	50.111	47.782	45.070	42.566	40.258	42.055	40.972
120.0	52.197	49.756	46.909	44.279	41.854	43.743	42.605
135.0	55.443	52.818	49.748	46.907	44.479	46.328	45.398
150.0	59.826	56.954	53.583	50.449	48.185	49.811	48.450
165.0	65.438	62.289	58.561	55.072	51.010	54.361	52.839
180.0	72.099	68.687	64.600	61.568	58.886	62.941	61.240
195.0	79.200	75.595	71.211	67.002	64.353	68.135	66.261
210.0	85.973	82.274	77.708	73.249	70.745	74.323	72.311
225.0	91.812	88.119	83.488	78.854	76.478	79.931	77.828
240.0	96.341	92.699	88.081	83.442	78.645	82.462	80.314
255.0	99.227	95.637	91.053	86.412	81.780	85.426	83.261
270.0	100.207	96.635	92.063	87.423	82.779	86.187	84.476
285.0	99.226	95.627	91.032	86.380	81.737	84.562	82.462
300.0	96.416	92.757	88.116	83.457	78.843	81.329	79.686
315.0	91.943	88.225	83.563	78.942	74.423	76.053	74.316
330.0	86.023	82.299	77.698	73.210	68.866	70.762	69.389
345.0	79.104	75.670	71.054	66.818	62.798	64.762	63.851

MACH NUMBER DISTRIBUTION

PSI	6.667	8.333	10.416	12.500	14.583	16.667	17.920
0.0	2.542	2.587	2.656	2.738	2.832	2.937	3.004
15.0	2.641	2.703	2.792	2.892	3.002	3.121	3.197
30.0	2.763	2.839	2.944	3.059	3.181	3.312	3.394
45.0	2.889	2.975	3.092	3.217	3.349	3.488	3.575
60.0	2.997	3.091	3.215	3.348	3.486	3.630	3.720
75.0	3.071	3.169	3.298	3.434	3.576	3.724	3.815
90.0	3.098	3.197	3.328	3.466	3.605	3.757	3.849
105.0	3.076	3.173	3.303	3.439	3.581	3.736	3.829
120.0	3.007	3.100	3.225	3.356	3.495	3.642	3.733
135.0	2.902	2.989	3.105	3.230	3.367	3.514	3.605
150.0	2.780	2.856	2.960	3.074	3.191	3.337	3.428
165.0	2.663	2.722	2.810	2.910	3.023	3.160	3.251
180.0	2.563	2.608	2.676	2.741	2.810	2.947	3.038
195.0	2.502	2.528	2.573	2.634	2.700	2.837	2.928
210.0	2.480	2.487	2.510	2.548	2.592	2.729	2.820
225.0	2.488	2.478	2.481	2.500	2.524	2.661	2.752
240.0	2.510	2.488	2.475	2.479	2.480	2.617	2.708
255.0	2.530	2.501	2.478	2.472	2.462	2.645	2.736
270.0	2.537	2.505	2.479	2.469	2.476	2.673	2.764
285.0	2.524	2.495	2.473	2.466	2.476	2.701	2.792
300.0	2.499	2.477	2.464	2.468	2.480	2.729	2.820
315.0	2.472	2.462	2.466	2.465	2.480	2.757	2.848
330.0	2.460	2.460	2.491	2.531	2.585	2.785	2.876
345.0	2.481	2.507	2.554	2.615	2.689	2.777	2.868

ITER COUNT ON TH75= 4      NEW TH75= -3.8      OLD TH75= -3.8      THRUST= 15353.6      TORQUE= 20.4

TEST CASE      ALTITUDE=96000 FT

ITERATION COUNT-14	BETA	THETA	LAG ANGLE
AZIMUTH STA			
0.0	-0.0022	-0.0605	0.0001
1.0	-0.0018	-0.0580	0.0001
3.0	-0.0005	-0.0553	0.0001
4.0	0.0014	-0.0538	0.0001
6.0	0.0038	-0.0535	0.0001
7.0	0.0065	-0.0532	0.0000
9.0	0.0092	-0.0523	0.0000
10.0	0.0120	-0.0506	-0.0000
12.0	0.0145	-0.0485	-0.0001
13.0	0.0167	-0.0492	-0.0001
15.0	0.0185	-0.0533	-0.0002
16.0	0.0197	-0.0573	-0.0002
18.0	0.0204	-0.0555	-0.0002
19.0	0.0202	-0.0613	-0.0002
21.0	0.0195	-0.0641	-0.0002
22.0	0.0180	-0.0665	-0.0002
24.0	0.0155	-0.0667	-0.0002
25.0	0.0133	-0.0653	-0.0001
27.0	0.0102	-0.0650	-0.0001
28.0	0.0073	-0.0655	-0.0001
30.0	0.0043	-0.0662	-0.0000
31.0	0.0017	-0.0649	0.0000
33.0	-0.0004	-0.0631	0.0000
34.0	-0.0017	-0.0619	0.0001

BLADE ANGLE OF ATTACK DISTRIBUTION

PSI	6.667	8.332	10.416	12.500	14.583	16.667	17.920
0.0	71.914	66.477	64.363	60.475	56.830	53.430	51.504
15.0	65.225	62.057	58.310	54.806	51.549	48.531	46.827
30.0	59.524	56.639	53.254	50.111	47.203	44.517	43.003
45.0	55.013	52.378	49.300	46.452	43.824	41.399	40.033
60.0	51.781	49.334	46.482	43.847	41.419	39.178	37.916
75.0	49.890	47.558	44.843	42.337	40.026	37.895	36.694
90.0	49.332	47.040	44.371	41.908	39.638	37.543	36.367
105.0	50.108	47.779	45.066	42.562	40.254	38.051	36.968
120.0	52.194	49.752	46.906	44.276	41.850	39.740	38.602
135.0	55.440	52.814	49.745	46.903	43.475	40.325	39.094
150.0	59.822	56.551	53.579	50.445	46.182	42.827	40.447
165.0	65.435	62.286	58.558	55.069	50.006	46.358	42.836
180.0	72.095	68.683	64.596	60.964	56.282	51.937	48.236
195.0	79.196	75.591	71.207	66.958	62.350	57.431	52.257
210.0	85.966	82.271	77.704	73.246	68.746	63.319	57.307
225.0	91.808	88.115	83.484	78.851	74.475	68.927	62.825
240.0	96.337	92.696	88.077	83.439	78.845	72.458	66.310
255.0	99.223	95.632	91.049	86.408	81.776	75.422	68.257
270.0	100.203	96.631	92.059	87.419	82.775	76.183	70.472
285.0	99.222	95.623	91.028	86.376	81.733	75.155	70.458
300.0	96.412	92.753	88.112	83.453	78.839	74.325	71.682
315.0	91.939	88.221	83.559	78.938	74.419	70.049	67.512
330.0	86.319	82.295	77.694	73.206	68.682	64.758	62.385
345.0	79.100	75.466	71.050	66.814	62.794	59.007	56.847

MACH NUMBER DISTRIBUTION

PSI	6.667	8.332	10.416	12.500	14.583	16.667	17.920
0.0	2.542	2.587	2.656	2.738	2.832	2.937	3.004
15.0	2.641	2.703	2.792	2.892	3.002	3.121	3.197
30.0	2.763	2.835	2.944	3.059	3.181	3.312	3.394
45.0	2.889	2.975	3.092	3.217	3.345	3.488	3.575
60.0	2.997	3.091	3.215	3.348	3.486	3.630	3.720
75.0	3.071	3.169	3.298	3.434	3.576	3.724	3.815
90.0	3.098	3.197	3.328	3.466	3.605	3.757	3.849
105.0	3.076	3.173	3.303	3.439	3.581	3.734	3.826
120.0	3.007	3.100	3.225	3.356	3.495	3.649	3.742
135.0	2.902	2.989	3.105	3.229	3.367	3.517	3.610
150.0	2.780	2.856	2.960	3.074	3.197	3.331	3.424
165.0	2.660	2.722	2.810	2.910	3.023	3.146	3.239
180.0	2.563	2.628	2.676	2.744	2.824	2.916	3.008
195.0	2.502	2.528	2.573	2.624	2.686	2.751	2.816
210.0	2.480	2.487	2.510	2.548	2.592	2.641	2.695
225.0	2.488	2.478	2.481	2.500	2.524	2.553	2.587
240.0	2.510	2.498	2.475	2.475	2.458	2.436	2.419
255.0	2.530	2.501	2.478	2.472	2.452	2.428	2.408
270.0	2.537	2.505	2.479	2.465	2.446	2.422	2.399
285.0	2.524	2.495	2.473	2.466	2.448	2.424	2.399
300.0	2.499	2.477	2.464	2.468	2.482	2.502	2.526
315.0	2.472	2.462	2.466	2.485	2.520	2.571	2.608
330.0	2.460	2.468	2.491	2.531	2.585	2.653	2.701
345.0	2.481	2.507	2.554	2.615	2.689	2.777	2.835

ITER COUNT ON TWT5= 5 NEW TWT5= -3.8 OLD TWT5= -3.8 THRUST= 15353.3 TORQUE= 17.2

TEST CASE ALTITUDE=96000 FT

ITERATION COUNT=13	BETA	THETA	LAG ANGLE
0.0	-0.0022	-0.0666	0.0001
15.0	-0.0018	-0.0581	0.0001
30.0	-0.0005	-0.0554	0.0001
45.0	0.0014	-0.0538	0.0001
60.0	0.0038	-0.0535	0.0001
75.0	0.0065	-0.0532	0.0000
90.0	0.0092	-0.0524	0.0000
105.0	0.0120	-0.0507	-0.0000
120.0	0.0141	-0.0486	-0.0001
135.0	0.0167	-0.0493	-0.0001
150.0	0.0185	-0.0533	-0.0002
165.0	0.0197	-0.0573	-0.0002
180.0	0.0204	-0.0595	-0.0002
195.0	0.0202	-0.0613	-0.0002
210.0	0.0195	-0.0641	-0.0002
225.0	0.0180	-0.0666	-0.0002
240.0	0.0155	-0.0667	-0.0002
255.0	0.0132	-0.0654	-0.0001
270.0	0.0103	-0.0650	-0.0001
285.0	0.0073	-0.0660	-0.0001
300.0	0.0042	-0.0663	-0.0000
315.0	0.0017	-0.0650	0.0000
330.0	-0.0004	-0.0632	0.0000
345.0	-0.0017	-0.0619	0.0001

BLADE ANGLE OF ATTACK DISTRIBUTION

PSI	6.667	9.333	10.416	12.500	14.583	15.667	17.920
0.0	71.911	68.474	64.360	60.472	56.627	53.427	51.500
15.0	65.222	62.054	58.366	54.863	51.546	48.527	46.824
30.0	59.521	56.636	53.251	50.167	47.200	44.514	43.000
45.0	55.009	52.374	49.256	46.448	43.820	41.396	40.030
60.0	51.778	49.331	46.479	43.864	41.415	39.175	37.913
75.0	48.981	47.559	44.840	42.333	40.123	37.891	36.690
90.0	46.329	45.037	42.368	41.905	39.635	37.540	36.359
105.0	44.104	42.775	40.163	42.559	40.251	42.048	40.965
120.0	42.190	40.740	46.903	44.273	41.847	43.736	42.599
135.0	55.437	52.811	49.742	46.960	48.472	46.322	45.091
150.0	56.819	56.948	53.576	50.442	52.178	49.804	48.443
165.0	65.432	62.283	58.555	55.066	51.603	54.355	52.832
180.0	72.092	68.680	64.593	65.931	62.875	56.934	56.233
195.0	79.193	75.588	71.204	66.955	69.347	66.128	64.255
210.0	85.963	82.268	77.701	72.243	75.743	72.317	70.304
225.0	91.805	88.112	83.481	78.888	81.472	77.924	75.822
240.0	96.334	92.693	88.074	83.436	78.642	82.455	80.307
255.0	99.220	95.630	91.046	84.405	81.773	85.419	83.254
270.0	100.200	96.628	92.056	87.416	82.772	78.180	75.469
285.0	99.219	95.620	91.325	86.373	81.730	77.152	74.455
300.0	96.409	92.750	88.109	83.450	78.636	74.322	71.679
315.0	91.936	88.218	83.556	78.935	74.416	70.046	67.509
330.0	86.016	82.292	77.691	73.203	68.280	64.755	62.382
345.0	79.097	75.462	71.047	66.811	62.191	59.004	56.844

MACH NUMBER DISTRIBUTION

PSI	6.667	9.333	10.416	12.500	14.583	16.667	17.920
0.0	2.542	2.587	2.656	2.738	2.832	2.937	3.064
15.0	2.641	2.732	2.792	2.892	3.002	3.121	3.197
30.0	2.763	2.839	2.944	3.059	3.181	3.312	3.394
45.0	2.889	2.975	3.092	3.217	3.345	3.488	3.575
60.0	2.997	3.091	3.215	3.348	3.486	3.630	3.720
75.0	3.071	3.169	3.298	3.424	3.576	3.724	3.815
90.0	3.098	3.197	3.328	3.466	3.609	3.757	3.849
105.0	3.076	3.172	3.303	3.439	3.581	3.757	3.849
120.0	3.007	3.100	3.225	3.356	3.455	3.659	3.757
135.0	2.902	2.989	3.105	3.229	3.328	3.527	3.624
150.0	2.780	2.856	2.960	3.074	3.174	3.376	3.464
165.0	2.660	2.722	2.810	2.910	3.013	3.216	3.304
180.0	2.563	2.608	2.676	2.744	2.812	3.016	3.104
195.0	2.502	2.528	2.573	2.634	2.696	2.900	2.988
210.0	2.480	2.487	2.513	2.548	2.582	2.825	2.913
225.0	2.488	2.478	2.481	2.500	2.524	2.776	2.864
240.0	2.510	2.488	2.475	2.479	2.468	2.728	2.816
255.0	2.530	2.501	2.478	2.472	2.462	2.728	2.816
270.0	2.537	2.505	2.479	2.469	2.476	2.728	2.816
285.0	2.524	2.495	2.473	2.466	2.476	2.728	2.816
300.0	2.499	2.477	2.464	2.468	2.488	2.728	2.816
315.0	2.472	2.462	2.466	2.485	2.520	2.728	2.816
330.0	2.460	2.468	2.491	2.531	2.585	2.728	2.816
345.0	2.481	2.537	2.554	2.615	2.689	2.777	2.835

TORQUE EQUILIBRIUM

CASE NO: 1

PSI	6.4676	8.3330	10.4160	12.5007	14.5830	16.6670	17.9200
0.0	71.9178	68.4727	64.3601	60.4717	56.9269	53.4269	51.5005
15.0	45.2219	62.0538	58.3065	54.8027	51.5461	48.5275	46.8237
30.0	59.5205	56.6360	53.2509	50.1072	47.1997	44.5136	43.0001
45.0	55.0794	52.3145	49.2983	46.4482	43.8204	41.3458	40.0301
60.0	51.7778	49.3307	46.4786	43.8441	41.4155	39.1751	37.9130
75.0	49.8871	47.5550	44.8358	42.3332	40.0229	37.8914	36.6902
90.0	49.3289	47.0364	44.3681	41.9050	39.6347	37.5398	36.3590
105.0	50.1042	47.7752	45.0632	42.5551	40.2508	37.8080	36.9652
120.0	52.1903	49.7490	46.9027	44.2726	41.8472	39.7364	38.5987
135.0	55.4367	52.8108	49.7416	46.9001	44.4722	42.3215	40.9910
150.0	59.8188	56.9478	53.5758	50.4415	48.1785	45.8040	44.4435
165.0	65.4317	62.2827	58.5547	55.0656	52.1032	49.3947	47.8324
180.0	72.0923	68.6802	64.5929	60.5605	57.8790	54.9343	52.2328
195.0	79.1935	75.5283	71.2043	66.9950	64.3469	61.1282	58.2545
210.0	85.9632	82.2678	77.7010	73.2427	70.7427	67.3165	64.3040
225.0	91.8053	88.1124	83.4810	78.5575	76.4717	73.243	70.0400
240.0	96.3340	92.6526	88.0741	83.4357	81.418	78.4552	75.8215
255.0	99.2200	95.6302	91.0450	86.4052	84.7731	82.4192	79.2341
270.0	100.1999	96.6281	92.0323	87.4162	85.7723	83.1802	80.3071
285.0	99.2193	95.6204	91.0246	86.3728	84.7302	82.4552	79.4590
300.0	96.4089	92.7457	88.1091	83.4456	81.8362	79.3225	76.4580
315.0	91.9362	88.2181	83.5564	78.6350	76.4161	73.0461	70.0461
330.0	86.0145	82.2518	77.6909	73.2026	70.8795	67.567	64.3825
345.0	79.0974	75.4632	71.0471	66.8109	62.7910	59.0038	56.8445

CF ATTACK DISTRIBUTION  
RADIAL STA.

OUT-OF-SHAFT FLAME AIR LOADING, LB./FT.

	RACIAL STATION						
PSI	6.6670	8.3330	10.4160	12.5000	14.5830	16.6670	17.9200
0.0	244.5888	248.0625	256.0293	264.5155	241.1636	256.2266	253.3030
15.0	250.4385	256.1848	257.8515	252.3483	247.1013	241.9474	238.8369
30.0	255.6674	250.7670	243.0378	239.5830	234.2499	228.8992	225.6287
45.0	244.8006	240.1069	234.5090	229.0610	223.6317	218.1049	214.6997
60.0	237.2801	232.7032	227.1592	221.6768	216.1438	210.6572	199.0959
75.0	233.7933	229.2506	223.6955	218.1521	212.5197	198.7766	190.2655
90.0	234.6432	230.0667	224.4557	218.8530	211.8016	197.7967	189.1793
105.0	239.9169	235.2351	229.5202	223.8286	218.0551	193.0273	166.6575
120.0	249.4485	244.5703	238.6853	232.8921	227.0690	199.7063	163.6741
135.0	262.4934	257.3049	251.1566	245.2142	239.6323	191.7927	156.0481
150.0	278.3152	272.6780	266.1353	259.5663	253.0627	199.8491	144.0833
165.0	275.1299	269.8445	263.0459	256.5635	250.5552	197.0908	130.8018
180.0	271.1794	265.2495	258.1326	251.4546	245.3044	196.9509	119.5266
195.0	268.6484	260.4514	254.9607	249.6958	243.1331	195.5339	106.3987
210.0	267.6731	267.1772	269.0066	273.3643	339.8938	348.8311	355.8650
225.0	267.6882	265.1174	264.4004	260.4707	252.2739	225.5386	199.1921
240.0	267.4067	263.4976	260.8308	256.9119	253.7620	231.4485	202.4744
255.0	265.6592	261.2112	257.4587	254.3376	251.5073	221.5449	190.8667
270.0	261.3657	257.4576	253.5629	252.1557	250.4544	217.4761	161.0615
285.0	256.7854	252.6257	249.2484	248.4506	250.3419	224.8233	258.7463
300.0	250.8718	247.4787	245.4675	246.0811	249.3415	225.0447	259.5710
315.0	245.2955	243.4706	243.5226	246.1830	251.2566	258.5408	263.8931
330.0	241.7149	241.9569	244.5552	249.4491	254.4719	245.3391	271.3911
345.0	241.3998	243.8695	248.8817	255.9015	264.5588	270.4504	267.7297

IN-SHAFT PLANE AIR LEADING, LB./FT.

PSI	RACIAL STATION									
	8.3.10	8.3.10	10.4160	12.5000	14.5830	16.6670	17.9200	19.2730	21.5260	23.7790
7.0	6.6670	8.3.10	10.4160	12.5000	14.5830	16.6670	17.9200	19.2730	21.5260	23.7790
15.0	0.5338	9.0650	8.1768	6.7461	1.4177	-3.1716	-5.4831	-7.7938	-10.1045	-12.4152
30.0	7.5367	6.4755	2.8233	-2.2420	-6.2403	-9.3169	-10.1717	-10.9265	-11.6813	-12.4361
45.0	4.9980	-0.2567	-4.6786	-8.1156	-10.6583	-12.5366	-13.3203	-14.1040	-14.8877	-15.6714
60.0	-2.4591	-5.5395	-8.5274	-10.7040	-12.1705	-13.0111	-13.2435	-13.4759	-13.7083	-13.9407
75.0	-5.7574	-7.8585	-9.7643	-10.9655	-11.5466	-12.0501	-12.4959	-12.8833	-13.2217	-13.5126
90.0	-7.0744	-8.5269	-9.6812	-10.1845	-10.1111	-10.1111	-10.1111	-10.1111	-10.1111	-10.1111
105.0	-7.3107	-9.4448	-9.2148	-9.3462	-9.5759	-12.2324	-13.2897	-14.3470	-15.4043	-16.4616
120.0	-6.7707	-7.9308	-8.7030	-8.6085	-8.1223	-37.5358	-38.6378	-39.7398	-40.8418	-41.9438
135.0	-5.1052	-6.5015	-7.8946	-8.3686	-8.1905	-35.1175	-36.6038	-38.0901	-39.5764	-41.0627
150.0	-1.0516	-3.5184	-5.7045	-7.6218	-25.5589	-26.5401	-31.6073	-32.5885	-37.6557	-38.6370
165.0	6.5544	3.6513	-1.1453	-3.6763	-15.1740	-20.3394	-23.1271	-25.9148	-28.7025	-31.4902
180.0	17.7467	9.0555	6.1134	1.2471	-2.0813	-2.8463	-12.5700	-13.3347	-14.1000	-14.8653
195.0	17.7467	10.3965	9.6329	9.6732	7.4152	4.9748	0.0554	0.0554	0.0554	0.0554
210.0	17.9528	10.3407	9.2655	8.5326	6.2789	6.6410	5.4338	4.2266	3.0194	1.8122
225.0	11.6889	10.3008	8.5372	7.7472	7.9498	6.2741	5.2040	4.1338	3.0636	1.9934
240.0	13.3964	10.9759	8.6138	6.9132	7.9899	5.7507	4.5575	3.3643	2.1711	0.9779
255.0	15.3524	12.0468	8.8179	6.3901	4.4922	5.8299	4.3150	2.8297	1.3444	0.0554
270.0	16.9025	13.1522	5.3589	6.5813	4.4524	6.7654	5.0731	3.3878	1.7605	0.0554
285.0	17.7221	14.0440	10.3462	7.6084	5.6028	4.0617	3.2213	2.3808	1.5403	0.6999
300.0	17.5756	14.3589	11.2487	9.6526	7.5228	3.3111	5.7629	4.6117	3.4612	2.3417
315.0	13.9751	13.7716	11.6286	10.2406	9.3512	8.6617	8.2216	7.7815	7.3414	6.9013
330.0	11.9705	11.3579	10.9538	10.6674	10.3734	9.8719	9.4332	8.9945	8.5558	8.1171
345.0	10.6915	10.4575	10.1231	9.8399	8.5054	5.7291	2.3161	0.0554	0.0554	0.0554

MOMENT ABOUT FEATHERING AXIS FT LB/FT

PSI	6.6670	8.3230	10.4160	12.5000	14.5830	16.6670	17.9200
0.0	3.8961	8.4194	14.8519	21.5655	27.4705	32.9432	36.3621
15.0	13.2724	18.6166	24.7677	29.9445	35.3809	41.0433	44.5381
30.0	22.7504	26.6856	31.8327	37.2155	42.7938	48.5299	52.0339
45.0	29.7076	32.8065	36.1266	43.6337	49.2807	55.0298	58.5168
60.0	33.5441	37.7616	43.1588	48.7837	54.4658	57.8510	57.4858
75.0	36.7826	41.0796	46.5956	52.2366	57.5572	57.4480	57.0149
90.0	38.1093	42.4559	48.0284	53.7186	58.4372	57.8222	57.3655
105.0	37.3393	41.7061	47.3122	53.0469	58.8646	57.8222	57.3655
120.0	34.5238	38.8731	44.4809	50.2435	56.1144	54.0761	52.4952
135.0	30.0803	34.3773	39.9520	45.7266	53.1427	56.2527	54.8371
150.0	24.3366	28.5309	34.0105	39.7388	48.6543	48.6543	48.6543
165.0	14.1926	20.0314	28.8186	32.3834	40.6273	32.3834	32.3834
180.0	4.1048	9.0227	16.0903	19.9007	26.4376	28.0448	28.0448
195.0	-3.7383	-0.1458	5.3673	11.5244	12.0906	19.4787	24.4457
210.0	-8.9778	-6.1372	-2.3493	2.6475	1.5629	6.3832	10.1294
225.0	-9.9778	-8.9341	-6.6928	-3.4375	-5.8072	-1.9304	0.8445
240.0	-10.1147	-9.9285	-8.7637	-6.5605	-3.3455	-6.7118	-4.6366
255.0	-9.6275	-9.9275	-9.4406	-7.9493	-5.4200	-9.0478	-7.3927
270.0	-8.6534	-9.7122	-9.4537	-8.2038	-5.9391	-2.6806	-0.0257
285.0	-9.3043	-9.5934	-8.1148	-7.6527	-5.1867	-1.7233	1.0841
300.0	-9.4805	-9.2964	-8.2340	-6.1187	-3.0555	1.2117	4.4312
315.0	-9.1069	-8.1626	-6.0957	-3.0760	1.3875	6.5597	10.3667
330.0	-7.2580	-5.3121	-2.0540	2.4364	8.1069	14.7535	19.1532
345.0	-3.1112	-0.0337	5.0244	11.0744	17.9699	24.8728	28.1373

OUT-OF-SHAFT PLANE AIR LOADING, LB./FT.

RADIAL STATION = 6.667  
 HARMONIC COMPONENT      CCSINE  
 1      -13.786794  
 2      6.091656  
 3      0.359286  
 4      -1.401536  
 STEADY COMPONENT =      254.674805  
 SINE  
 -7.402849  
 1.166416  
 7.727537  
 -0.089419

RADIAL STATION = 6.333  
 HARMONIC COMPONENT      CCSINE  
 1      -13.482778  
 2      16.170277  
 3      0.260281  
 4      6.848862  
 STEADY COMPONENT =      252.844238  
 SINE  
 -8.263203  
 1.097607  
 7.066202  
 -0.109534

RADIAL STATION = 10.414  
 HARMONIC COMPONENT      CCSINE  
 1      -13.224935  
 2      14.766572  
 3      0.081421  
 4      3.039327  
 STEADY COMPONENT =      251.303864  
 SINE  
 -10.694092  
 1.007717  
 5.072140  
 -0.142952

RADIAL STATION = 12.500  
 HARMONIC COMPONENT      CCSINE  
 1      -20.075241  
 2      25.336609  
 3      -7.157696  
 4      11.641092  
 STEADY COMPONENT =      254.002441  
 SINE  
 -15.033528  
 1.018835  
 1.764219  
 -0.049844

RADIAL STATION = 14.582  
 HARMONIC COMPONENT      CCSINE  
 1      -72.419583  
 2      54.320496  
 3      -6.406754  
 4      -10.329969  
 STEADY COMPONENT =      284.405273  
 SINE  
 -5.875090  
 -22.940399  
 21.548004  
 -14.422922

RADIAL STATION = 16.667  
 HARMONIC COMPONENT      CCSINE  
 1      -97.360565  
 2      24.195031  
 3      35.288483  
 4      -10.184221  
 STEADY COMPONENT =      312.177002  
 SINE  
 14.133656  
 -46.097076  
 10.906097  
 11.251251

RADIAL STATION = 17.920

HARMONIC COMPONENT

1  
2  
3  
4

CCSINE  
-100.556207  
25.877563  
35.160919  
-11.792999

SINE  
10.622812  
-48.904877  
10.462966  
13.616445

STEADY COMPONENT= 213.290283

## IN-SHAFT PLANE AIR LOADING, LB./FT.

RADIAL STATION = 6.667  
 HARMONIC COMPONENT      CCSINE  
 1      -0.485909  
 2      2.705995  
 3      -0.227611  
 4      0.756852  
 STEADY COMPONENT =      7.942711

SINE  
 -11.493509  
 -0.592422  
 1.768834  
 -0.156102

RADIAL STATION = 6.332  
 HARMONIC COMPONENT      CCSINE  
 1      -0.434431  
 2      3.515501  
 3      -0.310889  
 4      1.388323  
 STEADY COMPONENT =      5.095201

SINE  
 -11.161092  
 -0.983269  
 0.631281  
 -0.143653

RADIAL STATION = 10.414  
 HARMONIC COMPONENT      CCSINE  
 1      -0.395981  
 2      3.760422  
 3      -0.405143  
 4      1.671616  
 STEADY COMPONENT =      3.022158

SINE  
 -10.848969  
 -1.478809  
 -0.870974  
 -0.134543

RADIAL STATION = 12.500  
 HARMONIC COMPONENT      CCSINE  
 1      -0.401496  
 2      3.318238  
 3      -0.320808  
 4      1.591732  
 STEADY COMPONENT =      1.312488

SINE  
 -10.561731  
 -1.959785  
 -2.291933  
 -0.098194

RADIAL STATION = 14.583  
 HARMONIC COMPONENT      CCSINE  
 1      0.698514  
 2      2.076139  
 3      -1.655161  
 4      2.675309  
 STEADY COMPONENT =      -1.083366

SINE  
 -11.010288  
 0.096713  
 -3.399369  
 0.784683

RADIAL STATION = 16.667  
 HARMONIC COMPONENT      CCSINE  
 1      2.770060  
 2      3.012592  
 3      -5.464468  
 4      2.020690  
 STEADY COMPONENT =      -5.311560

SINE  
 -17.136185  
 3.809885  
 -4.154707  
 -2.806402

RADIAL STATION = 17.920

HARMONIC COMPONENT

- 1
- 2
- 3
- 4

STEADY COMPONENT =

-6.910592

CCSINE

- 3.361565
- 3.004430
- 5.999975
- 1.432653

SINE

- 17.391266
- 4.040148
- 4.348154
- 2.161797

MOMENT ABOUT FEATHERING AXIS FT LB/FT

RADIAL STATION = 6.667  
 HARMONIC COMPONENT  
 1 CCSINE -0.157795 SINE 25.727615  
 2 -4.504603 -0.560229  
 3 0.032234 2.240000  
 4 -0.455708 -0.110000  
 STEADY COMPONENT = 9.666500

RADIAL STATION = 8.332  
 HARMONIC COMPONENT  
 1 CCSINE -0.312163 SINE 28.076508  
 2 -3.626667 -0.608148  
 3 -0.023724 2.423188  
 4 0.026951 -0.098339  
 STEADY COMPONENT = 12.636306

RADIAL STATION = 10.614  
 HARMONIC COMPONENT  
 1 CCSINE -0.535315 SINE 30.565079  
 2 -1.555167 -0.627697  
 3 -0.080974 2.218919  
 4 0.560775 -0.093589  
 STEADY COMPONENT = 16.841370

RADIAL STATION = 12.500  
 HARMONIC COMPONENT  
 1 CCSINE -0.443870 SINE 32.444214  
 2 -0.796495 -0.620566  
 3 0.197349 1.672939  
 4 0.655921 -0.064514  
 STEADY COMPONENT = 21.402130

RADIAL STATION = 14.582  
 HARMONIC COMPONENT  
 1 CCSINE -3.234823 SINE 37.365494  
 2 1.220587 -6.390027  
 3 1.345082 6.467008  
 4 -1.758780 -3.107475  
 STEADY COMPONENT = 28.128693

RADIAL STATION = 16.667  
 HARMONIC COMPONENT  
 1 CCSINE -1.893228 SINE 47.809464  
 2 -2.033457 -15.508962  
 3 8.77522 3.708679  
 4 -2.337242 6.311008  
 STEADY COMPONENT = 37.961605

RADIAL STATION = 17.920

HARMONIC COMPONENT

- 1
- 2
- 3
- 4

STEADY COMPONENT • 41.501433

CCSINE

- 9.368592
- 1.107991
- 9.576694
- 3.075567

SINE

- 48.736328
- 17.672256
- 4.261292
- 7.599240

HARMONIC ANALYSIS ON BLADE FLAPPING ANGLE (RADIANS)

	CCS COMPONENT	SIN COMPONENT
1	0.011229	0.000539
2	0.000360	-0.000257
3	0.000040	0.000047
4	-0.000007	0.000002
	STEADY COMPONENT=	0.000000

HARMONIC ANALYSIS ON BLADE FEATHERING ANGLE (RADIANS)

	CCS COMPONENT	SIN COMPONENT
1	0.000701	-0.008115
2	0.000509	0.001203
3	-0.000560	-0.001018
4	0.000350	-0.000308
	STEADY COMPONENT=	-0.000000

ANGL OF ATTACK DATA AT EACH AZIMUTH POSITION

AZIMUTH = 0.0  
 MINIMUM ANGLE OF ATTACK = 50.2  
 MAXIMUM ANGLE OF ATTACK = 71.9  
 BLADE STA=1.00C  
 BLADE STA=0.355  
 TIP ANGLE OF ATTACK = 50.2  
 BLADE INBOARD END ANGLE OF ATTACK = 71.9

NONDIMENSIONAL RADIUS

60.0 0.681  
 70.0 0.405

AZIMUTH = 15.0  
 MINIMUM ANGLE OF ATTACK = 45.7  
 MAXIMUM ANGLE OF ATTACK = 65.2  
 BLADE STA=1.00C  
 BLADE STA=0.355  
 TIP ANGLE OF ATTACK = 45.7  
 BLADE INBOARD END ANGLE OF ATTACK = 65.2

NONDIMENSIONAL RADIUS

50.0 0.835  
 60.0 0.505

AZIMUTH = 30.0  
 MINIMUM ANGLE OF ATTACK = 42.0  
 MAXIMUM ANGLE OF ATTACK = 56.5  
 BLADE STA=1.00C  
 BLADE STA=0.355  
 TIP ANGLE OF ATTACK = 47.0  
 BLADE INBOARD END ANGLE OF ATTACK = 59.5

NONDIMENSIONAL RADIUS

50.0 0.671

AZIMUTH = 45.0  
 MINIMUM ANGLE OF ATTACK = 39.1  
 MAXIMUM ANGLE OF ATTACK = 55.0  
 BLADE STA=1.00C  
 BLADE STA=0.355  
 TIP ANGLE OF ATTACK = 39.1  
 BLADE INBOARD END ANGLE OF ATTACK = 55.0

NONDIMENSIONAL RADIUS

ANGLE OF ATTACK

50.0 0.530

AZIMUTH = 50.0  
 MINIMUM ANGLE OF ATTACK= 37.1 BLADE STA=1.000  
 MAXIMUM ANGLE OF ATTACK= 51.8 BLADE STA=0.355

TIP ANGLE OF ATTACK= 37.1 BLADE INBOARD END ANGLE OF ATTACK= 51.8

ANGLE OF ATTACK NONDIMENSIONAL RADIUS

40.0 C.848  
 50.0 C.420

AZIMUTH = 75.0  
 MINIMUM ANGLE OF ATTACK= 35.9 BLADE STA=1.000  
 MAXIMUM ANGLE OF ATTACK= 49.9 BLADE STA=0.355

TIP ANGLE OF ATTACK= 35.9 BLADE INBOARD END ANGLE OF ATTACK= 49.9

ANGLE OF ATTACK NONDIMENSIONAL RADIUS

40.0 0.779

AZIMUTH = 90.0  
 MINIMUM ANGLE OF ATTACK= 35.6 BLADE STA=1.000  
 MAXIMUM ANGLE OF ATTACK= 49.3 BLADE STA=0.355

TIP ANGLE OF ATTACK= 35.6 BLADE INBOARD END ANGLE OF ATTACK= 49.3

ANGLE OF ATTACK NONDIMENSIONAL RADIUS

40.0 C.760

AZIMUTH = 105.0  
 MINIMUM ANGLE OF ATTACK= 40.2 BLADE STA=1.000  
 MAXIMUM ANGLE OF ATTACK= 50.1 BLADE STA=0.355

TIP ANGLE OF ATTACK= 40.2 BLADE INBOARD END ANGLE OF ATTACK= 50.1

ANGLE OF ATTACK NONDIMENSIONAL RADIUS

50.0  
C.360

AZIMUTH = 120.0  
MINIMUM ANGLE OF ATTACK = 41.8  
MAXIMUM ANGLE OF ATTACK = 52.2  
BLADE STA=1.000  
BLADE STA=0.355

TIP ANGLE OF ATTACK = 41.8      BLADE INBOARD END ANGLE OF ATTACK = 52.2

ANGLE OF ATTACK      NONDIMENSIONAL RADIUS

50.0      0.435

AZIMUTH = 135.0  
MINIMUM ANGLE OF ATTACK = 44.3  
MAXIMUM ANGLE OF ATTACK = 55.4  
BLADE STA=1.000  
BLADE STA=0.355

TIP ANGLE OF ATTACK = 44.3      BLADE INBOARD END ANGLE OF ATTACK = 55.4

ANGLE OF ATTACK      NONDIMENSIONAL RADIUS

50.0      0.546

AZIMUTH = 150.0  
MINIMUM ANGLE OF ATTACK = 47.5  
MAXIMUM ANGLE OF ATTACK = 59.8  
BLADE STA=1.000  
BLADE STA=0.355

TIP ANGLE OF ATTACK = 47.5      BLADE INBOARD END ANGLE OF ATTACK = 59.8

ANGLE OF ATTACK      NONDIMENSIONAL RADIUS

50.0      0.680

AZIMUTH = 165.0  
MINIMUM ANGLE OF ATTACK = 51.8  
MAXIMUM ANGLE OF ATTACK = 65.4  
BLADE STA=1.000  
BLADE STA=0.355

TIP ANGLE OF ATTACK = 51.8      BLADE INBOARD END ANGLE OF ATTACK = 65.4

ANGLE OF ATTACK      NONDIMENSIONAL RADIUS

60.0      0.912

AZIMUTH = 159.0  
MINIMUM ANGLE OF ATTACK = 57.1      BLADE STA=1.000  
MAXIMUM ANGLE OF ATTACK = 72.1      BLADE STA=0.355

TIP ANGLE OF ATTACK = 57.1      BLADE INBOARD END ANGLE OF ATTACK = 72.1

ANGLE OF ATTACK      NONDIMENSIONAL RADIUS

60.0      0.286  
70.0      0.410

AZIMUTH = 195.0  
MINIMUM ANGLE OF ATTACK = 65.0      BLADE STA=1.000  
MAXIMUM ANGLE OF ATTACK = 75.2      BLADE STA=0.355

TIP ANGLE OF ATTACK = 63.0      BLADE INBOARD END ANGLE OF ATTACK = 79.2

ANGLE OF ATTACK      NONDIMENSIONAL RADIUS

70.0      0.587

AZIMUTH = 210.0  
MINIMUM ANGLE OF ATTACK = 65.0      BLADE STA=1.000  
MAXIMUM ANGLE OF ATTACK = 86.0      BLADE STA=0.355

TIP ANGLE OF ATTACK = 69.0      BLADE INBOARD END ANGLE OF ATTACK = 86.0

ANGLE OF ATTACK      NONDIMENSIONAL RADIUS

80.0      0.500

AZIMUTH = 225.0  
MINIMUM ANGLE OF ATTACK = 74.4      BLADE STA=1.000  
MAXIMUM ANGLE OF ATTACK = 91.8      BLADE STA=0.355

TIP ANGLE OF ATTACK = 74.4      BLADE INBOARD END ANGLE OF ATTACK = 91.8

ANGLE OF ATTACK      NONDIMENSIONAL RADIUS

90.0      0.640  
80.0      0.714  
80.0      0.624

90.0 0.399

AZIMUTH = 240.0  
MINIMUM ANGLE OF ATTACK = 78.8 BLADE STA=C.778  
MAXIMUM ANGLE OF ATTACK = 56.3 BLADE STA=0.355

TIP ANGLE OF ATTACK = 78.9 BLADE INBOARD END ANGLE OF ATTACK = 96.3

ANGLE OF ATTACK NONDIMENSIONAL RADIUS

80.0 0.750  
89.0 0.813  
90.0 0.509

AZIMUTH = 255.0  
MINIMUM ANGLE OF ATTACK = 81.8 BLADE STA=0.778  
MAXIMUM ANGLE OF ATTACK = 55.2 BLADE STA=C.355

TIP ANGLE OF ATTACK = 81.8 BLADE INBOARD END ANGLE OF ATTACK = 99.2

ANGLE OF ATTACK NONDIMENSIONAL RADIUS

90.0 0.581

AZIMUTH = 270.0  
MINIMUM ANGLE OF ATTACK = 73.7 BLADE STA=1.000  
MAXIMUM ANGLE OF ATTACK = 100.2 BLADE STA=0.355

TIP ANGLE OF ATTACK = 73.7 BLADE INBOARD END ANGLE OF ATTACK = 130.2

ANGLE OF ATTACK NONDIMENSIONAL RADIUS

80.0 0.845  
90.0 0.805  
100.0 0.361

AZIMUTH = 285.0  
MINIMUM ANGLE OF ATTACK = 72.7 BLADE STA=1.000  
MAXIMUM ANGLE OF ATTACK = 55.2 BLADE STA=0.355

TIP ANGLE OF ATTACK = 72.7 BLADE INBOARD END ANGLE OF ATTACK = 99.2

ANGLE OF ATTACK NONDIMENSIONAL RADIUS

80.0 C.820  
90.0 C.580

AZIMUTH = 309.0  
MINIMUM ANGLE OF ATTACK= 69.9 BLADE STA=1.000  
MAXIMUM ANGLE OF ATTACK= 96.4 BLADE STA=0.355

TIP ANGLE OF ATTACK= 69.9 BLADE INBOARD END ANGLE OF ATTACK= 96.4

ANGLE OF ATTACK NONDIMENSIONAL RADIUS

80.0 C.750  
90.0 C.510

AZIMUTH = 315.0  
MINIMUM ANGLE OF ATTACK= 65.8 BLADE STA=1.000  
MAXIMUM ANGLE OF ATTACK= 92.0 BLADE STA=0.355

TIP ANGLE OF ATTACK= 65.8 BLADE INBOARD END ANGLE OF ATTACK= 92.0

ANGLE OF ATTACK NONDIMENSIONAL RADIUS

70.0 C.890  
80.0 0.647  
90.0 0.47

AZIMUTH = 330.0  
MINIMUM ANGLE OF ATTACK= 60.8 BLADE STA=1.000  
MAXIMUM ANGLE OF ATTACK= 86.0 BLADE STA=0.355

TIP ANGLE OF ATTACK= 60.8 BLADE INBOARD END ANGLE OF ATTACK= 86.0

ANGLE OF ATTACK NONDIMENSIONAL RADIUS

70.0 0.749  
80.0 C.500

AZIMUTH = 345.0  
MINIMUM ANGLE OF ATTACK= 55.4 BLADE STA=1.000  
MAXIMUM ANGLE OF ATTACK= 79.1 BLADE STA=0.355

TIP ANGLE OF ATTACK= 55.4 BLADE INBOARD END ANGLE OF ATTACK= 79.1

ANGLE OF ATTACK      NONDIMENSIONAL RADIUS

60.0                    0.860  
70.0                    0.583

IFORCE ALONG FLIGHT PATH(CALC)= 13976.    (FORCE NORMAL TO FLIGHT PATH(CALC)= 6388.    ALFA= 62.001 DEG)

CONTROL INPUT  
FEATHERING (DEG)                    = -3.766  
STEADY CYCLIC(COS)= 0.0  
CYCLIC(SIN)= 0.0

THRUST= 1535.0                    HFORCE= 622.6  
MP= 0.2                            VFORCE= 23.7  
CT= 0.28967                        CM= 0.01233  
CP= 0.00000                        CY= 0.00045

MOMENT ABOUT Y AXIS = 16295.91 FT LB  
MOMENT ABOUT X AXIS = -937.39 FT LB

TYPE HISTORY

T(SEC)	U(FT/SEC) THETA(RAD)	V(FT/SEC) PHI(RAD)	W(FT/SEC) PSI(RAD)	X(RAD/SEC) K(FT)	Y(RAD/SEC) L(FT)	Z(RAD/SEC) M(FT)	OMEGA(RAD/SEC)
0.0	-9.8011E 02 1.1345E 00	0.0 0.0	-1.9236E 03 0.0	0.0 0.0	0.0 0.0	0.0 9.6000E 04	5.849E 01
0.100	-9.7606E 02 1.1345E 00	6.8417E-03 8.4049E-C8	-1.9135E 03 2.9603E-08	1.7091E-06 -2.1532E 02	1.3804E-04 3.6702E-04	3.7472E-07 9.6007E 04	5.3490E 01

MOMENTS ADDED TO BRING VEHICLE INTO TRIP AT T=C

MX= -1016.11 FT-LB  
 MY= 8459.67 FT-LB  
 MZ= 12.35 FT-LB

TIME HISTORY

CYCLE NO. = 1

PSI	T	TP	Z	ZP	B	BP
0.0	1.000E-00	0.0	0.0	0.0	0.0	0.0
15.0	2.144E-01	-6.032E-00	-4.120E-04	-3.147E-03	-1.663E-04	-1.273E-02
30.0	-8.411E-01	-2.061E-00	-1.332E-03	-3.870E-03	-8.870E-04	-4.242E-02
45.0	-4.832E-01	4.195E-00	-1.842E-03	-2.224E-05	-1.905E-03	-3.527E-02
60.0	6.088E-01	3.548E-00	-1.521E-03	2.475E-03	-2.317E-03	3.802E-04
75.0	6.547E-01	-3.157E-00	-1.128E-03	5.277E-04	-2.013E-03	1.941E-02
90.0	-3.368E-01	-4.377E-00	-1.218E-03	-1.975E-03	-1.789E-03	-2.296E-04
105.0	-7.229E-01	1.427E-00	-1.688E-03	-7.025E-04	-2.012E-03	-1.476E-03
120.0	5.255E-02	4.457E-00	-1.434E-03	2.492E-03	-2.014E-03	1.458E-02
135.0	6.741E-01	3.517E-01	-8.083E-04	2.280E-03	-1.176E-03	4.945E-03
150.0	1.870E-01	-3.973E-00	-6.589E-04	-1.450E-03	2.730E-05	4.247E-03
165.0	-5.400E-01	-1.587E-00	-1.257E-03	-2.614E-03	7.665E-04	1.400E-02
180.0	3.531E-01	3.220E-00	-1.559E-03	5.113E-04	1.037E-03	6.642E-04
195.0	3.639E-01	2.498E-00	-1.092E-03	3.057E-03	1.354E-03	1.759E-03
210.0	4.408E-01	-1.872E-00	-5.890E-04	7.432E-04	1.868E-03	2.157E-02
225.0	-1.785E-01	-2.857E-00	-7.668E-04	-2.294E-03	2.314E-03	1.259E-03
240.0	-4.566E-01	1.326E-01	-1.271E-03	-1.404E-03	2.482E-03	3.052E-05
255.0	1.393E-02	2.862E-00	-1.276E-03	1.365E-03	2.370E-03	-8.905E-04
270.0	4.245E-01	2.745E-01	-8.514E-04	1.573E-03	2.059E-03	-1.486E-02
285.0	1.263E-01	-2.552E-00	-7.659E-04	-6.140E-04	1.598E-03	-2.033E-02
300.0	-3.512E-01	-1.055E-00	-1.045E-03	-1.515E-03	9.794E-04	-2.643E-02
315.0	-2.352E-01	1.982E-00	-1.202E-03	3.121E-04	2.381E-04	-2.970E-03
330.0	2.422E-01	1.665E-00	-9.208E-04	1.834E-03	-4.635E-04	-2.390E-02
345.0	2.976E-01	-1.241E-00	-6.043E-04	5.621E-04	-1.017E-03	-1.838E-03
360.0	-1.186E-01	-1.938E-00	-6.685E-04	-1.225E-03	-1.545E-03	-2.197E-02

MAXIMUM ABSOLUTE RESPONSE

PSI	T	TP	Z	ZP	B	BP
0.0	1.000E-00	6.002E-00	1.842E-03	3.878E-03	2.482E-03	4.945E-03
15.0						
45.0						
37.0						
240.0						
135.0						

TIME HISTORY  
CYCLE NO. = 5

PSI	T	TP	Z	ZP	B	BP
0.0	-6.030E-04	-7.573E-02	-2.475E-04	-1.799E-05	-1.431E-03	2.041E-03
15.0	-1.131E-02	-6.072E-03	-2.528E-04	-2.209E-05	-8.535E-04	2.369E-03
30.0	-3.332E-03	6.703E-02	-2.519E-04	3.06CE-05	-2.095E-04	2.550E-03
45.0	9.182E-03	2.857E-02	-2.412E-04	5.089E-05	4.540E-04	2.549E-03
60.0	6.138E-03	-5.182E-02	-2.244E-04	1.626E-05	1.093E-03	2.303E-03
75.0	-6.427E-03	-4.417E-02	-2.317E-04	-1.076E-05	1.635E-03	1.835E-03
90.0	-7.932E-03	3.268E-02	-2.319E-04	9.504E-06	2.037E-03	1.242E-02
105.0	3.126E-03	5.180E-02	-2.250E-04	4.273E-05	2.278E-03	5.974E-04
120.0	8.333E-03	-1.262E-02	-2.152E-04	3.233E-05	2.343E-03	-1.015E-04
135.0	1.177E-04	-5.075E-02	-2.125E-04	-1.142E-05	2.219E-03	-8.449E-04
150.0	-7.360E-03	-6.360E-03	-2.161E-04	-1.614E-05	1.908E-03	-1.530E-03
165.0	-2.507E-03	4.346E-02	-2.146E-04	2.734E-05	1.440E-03	-2.052E-03
180.0	5.881E-03	2.042E-02	-2.050E-04	4.636E-05	0.586E-04	-2.386E-03
195.0	4.386E-03	-3.203E-02	-1.975E-04	1.027E-05	2.129E-04	-2.546E-03
210.0	-3.679E-03	-2.938E-02	-1.989E-04	-2.085E-05	-4.501E-04	-2.519E-03
225.0	-5.052E-03	1.678E-02	-2.015E-04	1.467E-06	-1.079E-03	-2.285E-02
240.0	1.703E-03	3.312E-02	-1.566E-04	3.598E-05	-1.621E-03	-1.859E-02
255.0	5.228E-03	-6.140E-03	-1.800E-04	2.917E-05	-2.032E-03	-1.279E-03
270.0	1.611E-04	-3.252E-02	-1.843E-04	-5.224E-07	-2.278E-03	-5.978E-04
285.0	-4.747E-03	-4.976E-03	-1.850E-04	-4.705E-06	-2.339E-03	1.291E-04
300.0	-1.645E-03	2.831E-02	-1.830E-04	2.016E-05	-2.211E-03	9.474E-04
315.0	3.837E-03	1.393E-02	-1.761E-04	3.298E-05	-1.904E-03	1.501E-03
330.0	2.878E-03	-2.124E-02	-1.765E-04	1.179E-05	-1.441E-03	2.030E-03
345.0	-2.529E-03	-2.004E-02	-1.700E-04	-7.641E-06	-8.636E-04	2.385E-03
360.0	-3.534E-03	1.236E-02	-1.764E-04	4.669E-06	-2.177E-04	2.550E-03

MAXIMUM ABSOLUTE RESPONSE

PSI	T	TP	Z	ZP	B	BP
15.0	1.131E-02	7.573E-02	2.528E-04	5.089E-05	2.343E-03	2.550E-03
0.0						
15.0						
45.0						
120.0						
30.0						

TFST CASE ALTITUDE=6000 FT

ITERATION COUNT=15	BETA	TMFTA	LAG ANGLE
AZIMUTH STA			
0.0	-0.0021	-0.0606	0.0001
15.0	-0.0017	-0.0561	0.0001
30.0	-0.0005	-0.0554	0.0001
45.0	0.0014	-0.0538	0.0001
60.0	0.0038	-0.0535	0.0001
75.0	0.0065	-0.0532	0.0000
90.0	0.0093	-0.0524	0.0000
105.0	0.0120	-0.0501	-0.0000
120.0	0.0145	-0.0486	-0.0001
135.0	0.0166	-0.0493	-0.0001
150.0	0.0184	-0.0534	-0.0002
165.0	0.0196	-0.0574	-0.0002
180.0	0.0202	-0.0595	-0.0002
195.0	0.0202	-0.0613	-0.0002
210.0	0.0194	-0.0641	-0.0002
225.0	0.0175	-0.0666	-0.0002
240.0	0.0158	-0.0667	-0.0002
255.0	0.0131	-0.0654	-0.0001
270.0	0.0102	-0.0650	-0.0001
285.0	0.0072	-0.0660	-0.0001
300.0	0.0042	-0.0663	-0.0000
315.0	0.0017	-0.0650	0.0000
330.0	-0.0004	-0.0632	0.0000
345.0	-0.0017	-0.0615	0.0001

BLADE ANGLE OF ATTACK DISTRIBUTION

PSI	10.416	12.500	14.583	16.667	17.920
0.0	6.667	6.333	6.000	5.667	5.333
1.0	71.834	68.405	64.976	61.547	58.118
2.0	65.169	61.991	58.562	55.133	51.704
3.0	59.426	56.535	53.106	49.677	46.248
4.0	54.906	52.267	48.835	45.398	42.059
5.0	51.669	49.219	46.379	43.161	39.922
7.5	49.775	47.441	44.724	42.217	39.507
10.0	49.216	46.922	44.252	41.789	39.115
12.5	49.993	47.662	44.944	42.444	39.777
15.0	52.084	49.639	46.791	44.134	41.933
17.5	55.335	52.705	49.632	46.768	44.209
20.0	59.724	56.847	53.469	50.311	46.692
22.5	65.132	62.194	58.457	54.951	51.249
25.0	71.916	68.612	64.512	60.794	56.842
27.5	79.166	75.547	71.147	66.924	62.054
30.0	85.962	82.252	77.667	73.152	68.263
32.5	91.827	88.120	83.469	78.853	73.812
35.0	96.374	92.718	87.423	82.423	77.691
37.5	99.272	95.669	90.066	85.667	81.757
40.0	100.255	96.670	92.081	87.422	83.243
42.5	99.269	95.657	91.044	86.373	82.440
45.0	96.448	92.775	88.116	83.418	79.623
47.5	91.959	88.227	83.546	78.917	75.428
50.0	86.016	82.277	77.658	73.153	69.985
52.5	79.068	75.420	70.988	66.738	62.298

MACH NUMBER DISTRIBUTION

PSI	10.416	12.500	14.583	16.667	17.920
0.0	6.667	6.333	6.000	5.667	5.333
1.0	71.834	68.405	64.976	61.547	58.118
2.0	65.169	61.991	58.562	55.133	51.704
3.0	59.426	56.535	53.106	49.677	46.248
4.0	54.906	52.267	48.835	45.398	42.059
5.0	51.669	49.219	46.379	43.161	39.922
7.5	49.775	47.441	44.724	42.217	39.507
10.0	49.216	46.922	44.252	41.789	39.115
12.5	49.993	47.662	44.944	42.444	39.777
15.0	52.084	49.639	46.791	44.134	41.933
17.5	55.335	52.705	49.632	46.768	44.209
20.0	59.724	56.847	53.469	50.311	46.692
22.5	65.132	62.194	58.457	54.951	51.249
25.0	71.916	68.612	64.512	60.794	56.842
27.5	79.166	75.547	71.147	66.924	62.054
30.0	85.962	82.252	77.667	73.152	68.263
32.5	91.827	88.120	83.469	78.853	73.812
35.0	96.374	92.718	87.423	82.423	77.691
37.5	99.272	95.669	90.066	85.667	81.757
40.0	100.255	96.670	92.081	87.422	83.243
42.5	99.269	95.657	91.044	86.373	82.440
45.0	96.448	92.775	88.116	83.418	79.623
47.5	91.959	88.227	83.546	78.917	75.428
50.0	86.016	82.277	77.658	73.153	69.985
52.5	79.068	75.420	70.988	66.738	62.298

CONTROL INPUT

FEATHERING (DEG)	-3.766
STEADY	0.0
CYCLIC(COS)	0.0
CYCLIC(SIN)	0.0

(FORCE ALONG FLIGHT PATH)CALC= 13885. (FORCE NORMAL TO FLIGHT PATH)CALC= 6355. ALFA= 63.001( DEG)

THRUST= 15252.5      WFORCE= 6.9.6  
MP= 1.8              YFORCE= 23.2  
CT= 0.28777          CH= 0.01226  
CP= 0.00002          CY= 0.00044

MOMENT ABOUT Y AXIS = 16187.13 FT LB  
MOMENT ABOUT X AXIS = -861.26 FT LB

## TIME HISTORY

T(SEC)	U(FT/SEC) THETA(RAD)	V(FT/SEC) PHI(RAD)	W(FT/SEC) PSI(RAD)	P(RAD/SEC) X(FT)	Q(RAD/SEC) Y(FT)	R(RAD/SEC) Z(FT)	OMEGA(RAD/SEC)
0.100	-9.7606E 02 1.1345E 00	6.8417E-03 8.2045E-08	-1.915E 03 2.9663E-08	1.7091E-04 -2.1932E 02	1.3804E-04 3.4702E-04	3.7472E-C7 9.6907E 04	5.8450E 01
0.200	-9.7210E 02 1.1345E 00	-1.1562E-C1 1.2515E-C4	-1.9083E 03 5.1150E-05	1.5630E-03 -4.2978E 02	-7.3077E-04 1.3750E-03	4.2553E-C4 9.5015E 04	5.8450E 01

TIME HISTORY

CYCLE NO. = 1

PSI	T	TP	Z	ZP	B	BP
0.0	1.000E-01	0.0	0.0	0.0	0.0	0.0
15.0	2.142E-01	-6.003E 00	-4.101E-04	-3.133E-03	-1.669E-04	-1.275E-03
30.0	-8.413E-01	-2.061E 00	-1.326E-03	-3.863E-03	-8.895E-04	-4.245E-02
45.0	-4.832E-01	4.757E 00	-1.835E-03	-2.306E-05	-1.907E-03	-3.524E-03
60.0	6.092E-01	3.549E 00	-1.515E-03	2.465E-03	-2.318E-03	3.814E-04
75.0	6.550E-01	-3.200E 00	-1.123E-03	5.262E-04	-2.014E-03	1.241E-02
90.0	-3.371E-01	-4.380E 00	-1.312E-03	-1.968E-03	-1.790E-03	-2.316E-04
105.0	-7.234E-01	1.429E 00	-1.641E-03	-7.009E-04	-2.013E-03	-1.474E-03
120.0	5.280E-02	4.500E 00	-1.425E-03	2.483E-03	-2.014E-03	1.465E-02
135.0	6.748E-01	2.511E 01	-8.646E-04	2.279E-03	-1.175E-03	4.950E-02
150.0	1.870E-01	-3.877E 00	-6.553E-04	-1.444E-03	2.917E-05	4.245E-03
165.0	-5.415E-01	1.025E 00	1.252E-03	-2.806E-03	7.677E-04	1.396E-03
180.0	-3.534E-01	7.025E 00	-1.552E-03	5.098E-04	1.032E-03	6.855E-04
195.0	3.648E-01	2.461E 00	-1.687E-03	3.048E-03	1.355E-03	1.762E-03
210.0	4.413E-01	-1.876E 00	-5.855E-04	7.815E-04	1.868E-03	2.157E-03
225.0	-1.790E-01	-4.863E 00	-7.826E-04	-2.289E-03	2.315E-03	1.255E-03
240.0	-4.575E-01	7.353E-01	-1.266E-03	-1.401E-03	2.483E-03	2.805E-05
255.0	1.423E-02	2.869E 00	-1.771E-03	1.361E-03	2.370E-03	-8.916E-04
270.0	4.256E-01	2.743E-01	-8.874E-04	1.570E-03	2.059E-03	-1.488E-02
285.0	1.265E-01	-2.559E 00	-7.420E-04	-6.125E-04	1.997E-03	-2.036E-03
300.0	-3.522E-01	-1.098E 00	-2.540E-03	-1.513E-03	9.780E-04	-2.695E-02
315.0	-2.356E-01	1.988E 00	-1.897E-03	3.110E-04	2.364E-04	-2.970E-03
330.0	2.432E-01	1.670E 00	-9.188E-04	1.833E-03	-4.649E-04	-2.387E-03
345.0	2.986E-01	-1.247E 00	-6.007E-04	5.812E-04	-1.019E-03	-1.817E-03
360.0	-1.171E-01	-1.944E 00	-6.644E-04	-1.224E-03	-1.546E-03	-7.200E-03

MAXIMUM ABSOLUTE RESPONSE

PSI	T	TP	Z	ZP	B	BP
0.0	1.000E 00	6.003E 00	1.835E-03	3.863E-03	2.483E-03	4.950E-03
15.0						
45.0						
30.0						
240.0						
135.0						

TYPE HISTORY  
CYCLE NO. = 5

PSI	T	TP	Z	ZP	B	BP
0.0	-6.104E-04	-7.663E-02	-2.464E-04	-1.832E-05	-1.430E-03	2.042E-03
15.0	-1.145E-02	-6.112E-03	-2.519E-04	-2.328E-05	-5.527E-04	2.370E-02
30.0	-3.371E-03	6.584E-02	-2.510E-04	3.042E-05	-2.086E-04	2.551E-03
45.0	9.296E-03	2.352E-02	-2.403E-04	5.110E-05	4.540E-04	2.550E-03
60.0	6.215E-03	-1.247E-02	-2.315E-04	1.620E-05	1.054E-03	2.303E-03
75.0	-8.017E-03	-4.473E-02	-2.308E-04	-1.105E-05	1.636E-03	1.834E-03
90.0	3.166E-03	5.245E-02	-2.242E-04	4.290E-05	2.038E-03	1.241E-03
105.0	8.439E-03	-1.217E-02	-2.143E-04	3.243E-05	2.279E-03	5.966E-04
120.0	1.164E-04	-5.140E-02	-2.116E-04	-1.168E-05	2.344E-03	-1.022E-04
135.0	-7.458E-03	-6.461E-03	-2.153E-04	1.646E-05	1.908E-03	-8.460E-04
150.0	-2.540E-03	4.403E-02	-2.139E-04	2.740E-05	1.439E-03	-1.532E-02
165.0	4.642E-03	-3.247E-02	-2.042E-04	4.662E-05	1.439E-03	-2.053E-03
180.0	-3.733E-03	-2.958E-02	-1.567E-04	1.022E-05	2.119E-04	-2.387E-02
215.0	-5.163E-03	1.905E-02	-2.508E-04	-2.120E-05	-4.512E-04	-2.519E-03
225.0	1.728E-03	3.359E-02	-1.559E-04	1.310E-06	-1.080E-03	-2.283E-02
240.0	5.305E-03	-6.270E-03	-1.673E-04	3.616E-05	-1.622E-03	-1.858E-03
270.0	1.681E-04	-2.297E-02	-1.835E-04	2.930E-05	-2.033E-03	-1.278E-03
285.0	-4.809E-03	-5.052E-03	-1.843E-04	-6.860E-07	-2.278E-03	-5.969E-04
300.0	-1.714E-03	2.870E-02	-1.823E-04	-2.016E-05	-2.340E-03	1.302E-04
315.0	3.891E-03	1.411E-02	-1.754E-04	3.221E-05	-2.211E-03	8.487E-04
330.0	2.916E-03	-2.156E-02	-1.658E-04	1.103E-05	-1.904E-03	1.503E-03
345.0	-2.566E-03	-1.032E-02	-1.494E-04	-7.882E-06	-1.441E-03	2.031E-03
360.0	-3.585E-03	1.223E-02	-1.658E-04	4.557E-06	-2.102E-04	2.386E-03

MAXIMUM ABSOLUTE RESPONSE

PSI	T	TP	Z	ZP	B	BP
15.0	1.145E-02	7.663E-02	2.519E-04	5.110E-05	2.344E-03	2.551E-03
0.0						
15.0						
45.0						
120.0						
30.0						

TFST CASE ALTITUDE=96000 FT

ITERATION COUNT=14

AZIMUTH STA	BETA	TMETA	SAG ANGLE
0.0	-0.0025	-0.0606	0.0001
15.0	-0.0020	-0.0581	0.0001
30.0	-0.0007	-0.0534	0.0001
45.0	0.0013	-0.0538	0.0001
60.0	0.0038	-0.0535	0.0001
75.0	0.0067	-0.0533	0.0000
90.0	0.0095	-0.0525	0.0000
105.0	0.0122	-0.0507	-0.0000
120.0	0.0147	-0.0486	-0.0001
135.0	0.0165	-0.0493	-0.0001
150.0	0.0187	-0.0534	-0.0002
165.0	0.0199	-0.0574	-0.0002
180.0	0.0204	-0.0595	-0.0002
195.0	0.0203	-0.0613	-0.0002
210.0	0.0194	-0.0641	-0.0002
225.0	0.0178	-0.0666	-0.0002
240.0	0.0154	-0.0667	-0.0002
255.0	0.0125	-0.0653	-0.0001
270.0	0.0095	-0.0650	-0.0001
285.0	0.0066	-0.0660	-0.0001
300.0	0.0038	-0.0663	-0.0000
315.0	0.0012	-0.0650	-0.0000
330.0	-0.0000	-0.0632	0.0000
345.0	-0.0021	-0.0619	0.0001



THRUST= 15155.6  
HP= 3.5  
CT= 0.28595  
CP= 0.00003

MFORCE= 648.5  
YFORCE= 21.1

CH= 0.01224  
CY= 0.00040

MOMENT ABOUT Y AXIS = 16599.29 FT LB  
MOMENT ABOUT X AXIS = -478.98 FT LB

TIPS HISTORY

T(SFC)	UIFT/SEC) THETA(RAD)	VIFT/SEC) PHI(RAD)	WIFT/SEC) PSI(RAD)	F(RAD/SEC) X(IF)	Q(RAD/SEC) Y(IF)	R(RAD/SEC) Z(IF)	OMEGA(RAD/SEC)
0.200	-9.7210E 02 1.1345E 00	-1.1582E-01 1.2515E-04	-1.9082E 03 5.1151E-05	1.5630E-03 -4.2978E 02	-7.3077E-04 1.3750E-03	4.2953E-04 9.6015E 04	5.3450E 01
0.300	-9.6751E 02 1.1348E 00	-1.1283E 00 1.1128E-03	-1.9010E 03 4.5024E-04	1.0763E-02 -6.4338E 02	6.7586E-03 2.9654E-03	2.9708E-03 9.6022E 04	5.3451E 01

TIME HISTORY  
CYCLE NO. = 1

PSI	T	TP	Z	ZP	B	BP
0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0
15.0	2.142E-01	-6.003E 00	-4.084E-04	-3.120E-03	-1.675E-04	-1.279E-03
30.0	-8.416E-01	-2.002E 00	-1.221E-03	-3.848E-03	-8.910E-04	-4.248E-03
45.0	-4.834E-01	4.758E 00	-1.827E-03	-2.419E-05	-1.908E-03	-3.523E-03
60.0	6.035E-01	3.511E 00	-1.309E-03	2.456E-03	-2.319E-03	3.674E-04
75.0	6.533E-01	-3.201E 00	-1.319E-03	5.251E-04	-2.014E-03	1.942E-03
90.0	-3.374E-01	-4.302E 00	-1.367E-03	-1.961E-03	-1.790E-03	-2.332E-04
105.0	-7.238E-01	1.430E 00	-1.695E-03	-6.991E-04	-2.013E-03	-1.474E-03
120.0	5.289E-02	4.504E 00	-1.423E-03	2.474E-03	-2.014E-03	1.470E-03
135.0	6.744E-01	2.515E-01	-8.013E-04	2.273E-03	-1.173E-03	4.954E-07
150.0	1.871E-01	-3.981E 00	-6.920E-04	-1.438E-03	3.110E-03	4.244E-07
165.0	-5.422E-01	-1.590E 00	-1.247E-03	-2.790E-03	7.689E-04	1.393E-02
180.0	3.538E-01	3.030E 00	-1.547E-03	5.060E-04	1.038E-03	6.658E-04
195.0	3.634E-01	2.465E 00	-1.682E-03	3.040E-03	1.357E-03	1.765E-03
210.0	4.420E-01	-1.880E 00	-5.623E-04	7.809E-04	1.670E-03	2.156E-02
225.0	-1.795E-01	-2.888E 00	-7.789E-04	-2.316E-03	2.316E-03	1.252E-07
240.0	-4.585E-01	7.367E-01	-1.641E-03	-1.400E-03	2.483E-03	2.564E-05
255.0	1.428E-02	2.875E 00	-1.268E-03	1.358E-03	2.370E-03	-8.930E-04
270.0	4.267E-01	2.755E-01	-8.835E-04	1.568E-03	2.058E-03	-1.489E-03
285.0	1.269E-01	-2.566E 00	-7.582E-04	-6.105E-04	1.596E-03	-2.037E-02
300.0	-3.531E-01	-1.102E 00	-1.636E-03	-1.511E-03	9.764E-04	-2.697E-03
315.0	-2.364E-01	1.493E 00	-1.193E-03	3.087E-04	2.371E-04	-2.969E-02
330.0	2.439E-01	1.676E 00	-9.139E-04	1.831E-03	-4.640E-04	-2.385E-02
345.0	2.986E-01	-1.250E 00	-5.974E-04	5.819E-04	-1.018E-03	-1.835E-02
360.0	-1.195E-01	-1.952E 00	-6.814E-04	-1.223E-03	-1.547E-03	-2.201E-02

MAXIMUM ABSOLUTE RESPONSE

PSI	T	TP	Z	ZP	B	BP
3.0	1.000E 00	0.003E 00	1.827E-03	3.848E-03	2.483E-03	4.954E-03
15.0						
45.0						
30.0						
240.0						
135.0						

TIME HISTORY  
CYCLE NO. = 5

PSI	T	TP	Z	ZP	B	RP
0.0	-6.510E-04	-7.791E-02	-2.452E-04	-1.692E-05	-1.429E-03	2.043E-03
15.0	-1.165E-02	-6.083E-03	-2.508E-04	-2.384E-05	-8.517E-04	2.370E-03
30.0	-3.403E-03	6.966E-02	-2.499E-04	3.059E-05	-2.075E-04	2.551E-03
45.0	9.471E-03	2.929E-02	-2.302E-04	5.146E-05	4.601E-04	2.550E-03
60.0	6.303E-03	-5.347E-02	-2.303E-04	1.605E-05	1.095E-03	2.303E-03
75.0	-6.639E-03	-4.541E-02	-2.257E-04	-1.150E-05	1.637E-03	1.833E-03
90.0	-8.140E-03	3.379E-02	-2.300E-04	9.258E-06	2.039E-03	1.239E-03
105.0	3.243E-03	5.333E-02	-2.232E-04	4.321E-05	2.279E-03	5.957E-04
120.0	8.585E-03	-1.211E-02	-2.132E-04	3.294E-05	2.344E-03	-1.028E-04
135.0	9.771E-05	-5.232E-02	-2.166E-04	-1.215E-05	2.219E-03	-8.471E-04
150.0	-7.598E-03	-6.466E-03	-2.144E-04	-1.690E-05	1.908E-03	-1.533E-03
165.0	-2.571E-03	4.487E-02	-2.130E-04	2.761E-05	1.438E-03	-2.054E-03
180.0	6.075E-03	2.118E-02	-2.032E-04	4.703E-05	8.567E-04	-2.388E-03
195.0	4.510E-03	-3.314E-02	-1.557E-04	1.007E-05	2.108E-04	-2.547E-03
210.0	-3.817E-03	-3.047E-02	-1.933E-04	-2.174E-05	-4.523E-04	-2.519E-03
225.0	-5.255E-03	1.949E-02	-1.599E-04	1.145E-06	-1.081E-03	-2.285E-03
240.0	1.775E-03	3.421E-02	-1.590E-04	3.648E-05	-1.623E-03	-1.858E-03
255.0	5.405E-03	-6.472E-03	-1.844E-04	3.947E-05	-2.034E-03	-1.277E-03
270.0	1.522E-04	-3.366E-02	-1.827E-04	-9.797E-07	-2.279E-03	-5.958E-04
285.0	-4.920E-03	-5.054E-03	-1.835E-04	5.253E-06	-2.340E-03	1.314E-04
300.0	-1.745E-03	2.935E-02	-1.815E-04	3.029E-05	-2.211E-03	8.496E-04
315.0	3.978E-03	1.437E-02	-1.746E-04	3.252E-05	-1.903E-03	1.504E-03
330.0	2.968E-03	-2.209E-02	-1.689E-04	1.093E-05	-1.440E-03	2.032E-03
345.0	-2.634E-03	-2.071E-02	-1.686E-04	-8.287E-06	-8.619E-04	2.386E-03
360.0	-3.655E-03	1.291E-02	-1.631E-04	4.436E-06	-2.157E-04	2.550E-03

MAXIMUM ABSOLUTE RESPONSE

PSI	T	TP	Z	ZP	B	RP
15.0	1.165E-02	7.791E-02	2.508E-04	5.146E-05	2.344E-03	2.551E-03
0.0						
15.0						
45.0						
120.0						
30.0						

TEST CASE ALTITUDE=56000 FT

OPERATION COUNT=11	BETA	TETA	LAG ANGLE
AZIMUTH STA			
0.0	-0.0044	-0.0666	0.0001
15.0	-0.0042	-0.0581	0.0001
30.0	-0.0031	-0.0553	0.0001
45.0	-0.0012	-0.0538	0.0001
60.0	0.0015	-0.0535	0.0001
75.0	0.0046	-0.0533	0.0000
90.0	0.0078	-0.0525	-0.0000
105.0	0.0111	-0.0507	-0.0001
120.0	0.0142	-0.0485	-0.0001
135.0	0.0170	-0.0492	-0.0002
150.0	0.0194	-0.0534	-0.0002
165.0	0.0212	-0.0574	-0.0002
180.0	0.0222	-0.0595	-0.0002
195.0	0.0225	-0.0612	-0.0002
210.0	0.0218	-0.0640	-0.0002
225.0	0.0202	-0.0666	-0.0002
240.0	0.0175	-0.0667	-0.0001
255.0	0.0145	-0.0653	-0.0001
270.0	0.0115	-0.0645	-0.0001
285.0	0.0076	-0.0655	-0.0001
300.0	0.0043	-0.0663	-0.0000
315.0	0.0010	-0.0665	-0.0000
330.0	-0.0014	-0.0631	0.0000
345.0	-0.0035	-0.0615	0.0001

BLADE ANGLE OF ATTACK DISTRIBUTION

PSI	6.667	8.333	10.416	12.500	14.583	16.667	17.920
0.0	71.764	69.258	64.155	60.243	56.580	53.168	51.236
15.0	65.048	61.856	58.785	54.563	51.294	48.266	46.559
30.0	59.272	56.371	52.971	49.816	46.501	44.212	42.657
45.0	54.727	52.080	48.993	46.134	43.501	41.075	39.709
60.0	51.467	49.009	46.148	43.507	41.074	38.833	37.570
75.0	49.554	47.212	44.688	41.575	39.661	37.528	36.327
90.0	48.984	46.682	44.004	41.534	39.259	37.162	35.981
105.0	49.761	47.420	44.657	42.185	39.871	41.671	40.585
120.0	51.860	49.405	46.545	43.604	41.471	42.365	42.224
135.0	55.128	52.485	49.358	46.542	48.120	45.960	44.725
150.0	59.542	56.649	53.254	50.101	51.466	49.459	48.091
165.0	65.206	62.029	58.272	54.758	56.708	54.041	52.510
180.0	71.939	68.494	64.365	65.749	62.640	59.672	57.958
195.0	79.122	75.479	71.051	66.802	69.176	65.928	64.038
210.0	85.965	82.230	77.615	73.112	75.637	72.177	70.146
225.0	91.869	88.137	83.455	78.813	81.424	77.840	75.716
240.0	96.448	92.767	88.099	83.410	86.788	82.419	80.249
255.0	99.368	95.740	91.105	86.414	91.733	87.417	84.229
270.0	100.360	96.749	92.127	87.436	92.742	88.103	84.367
285.0	99.366	95.728	91.081	86.378	91.686	87.062	84.340
300.0	96.524	92.824	88.132	83.422	88.761	84.206	81.560
315.0	92.003	88.244	83.532	78.863	84.302	79.896	77.340
330.0	86.019	82.254	77.607	73.078	78.120	74.567	72.181
345.0	79.023	75.354	70.899	66.630	72.584	69.777	67.609

MACH NUMBER DISTRIBUTION

PSI	6.667	8.333	10.416	12.500	14.583	16.667	17.920
0.0	2.518	2.562	2.633	2.716	2.811	2.917	2.985
15.0	2.616	2.679	2.760	2.870	2.981	3.101	3.177
30.0	2.740	2.817	2.923	3.038	3.162	3.293	3.375
45.0	2.866	2.953	3.071	3.196	3.330	3.469	3.536
60.0	2.974	3.069	3.194	3.327	3.466	3.611	3.701
75.0	3.048	3.146	3.276	3.413	3.555	3.704	3.795
90.0	3.075	3.174	3.306	3.444	3.588	3.737	3.829
105.0	3.052	3.150	3.280	3.416	3.556	3.707	3.799
120.0	2.982	3.076	3.201	3.333	3.472	3.623	3.715
135.0	2.877	2.964	3.081	3.206	3.346	3.500	3.593
150.0	2.754	2.830	2.935	3.050	3.184	3.344	3.437
165.0	2.634	2.696	2.785	2.885	3.000	3.164	3.257
180.0	2.537	2.582	2.650	2.718	2.801	2.937	3.030
195.0	2.476	2.501	2.547	2.608	2.681	2.800	2.893
210.0	2.453	2.460	2.483	2.522	2.578	2.662	2.755
225.0	2.461	2.452	2.455	2.474	2.494	2.544	2.637
240.0	2.483	2.462	2.449	2.452	2.472	2.514	2.607
255.0	2.504	2.474	2.452	2.445	2.456	2.494	2.587
270.0	2.510	2.478	2.452	2.442	2.445	2.473	2.566
285.0	2.497	2.468	2.446	2.440	2.450	2.477	2.570
300.0	2.471	2.450	2.438	2.442	2.463	2.499	2.592
315.0	2.445	2.436	2.440	2.460	2.496	2.547	2.640
330.0	2.434	2.442	2.466	2.506	2.562	2.631	2.724
345.0	2.456	2.482	2.530	2.592	2.667	2.755	2.848

(FORCE ALONG FLIGHT PATH)CALC= 6249. ALFAR= 63.03(NEG)

(FORCE NORMAL TO FLIGHT PATH)CALC= 6249.

CONTROL INPUT  
 FEATHERING (DEG) = -3.766  
 STEADY CYCLIC(COS) = 0.0  
 CYCLIC(SIN) = 0.0

THRUST= 15074.2      MFORCE= 655.6  
HP= 6.9              YFORCE= 32.4  
CT= 0.28439          CM= 0.01244  
CP= 0.00005          CV= 0.00061

MOMENT ABOUT Y AXIS = 19400.88 FT LB  
MOMENT ABOUT X AXIS = -2935.70 FT LB

## TIME HISTORY

T(SEC)	U(FT/SEC) THETA(RAD)	V(FT/SEC) PHI(RAD)	W(FT/SEC) PSI(RAD)	FIRAD/SEC X(FT)	QIRAD/SEC Y(FT)	RIRAD/SEC Z(FT)	OMEGA(RAD/SEC)
9.300	-9.6751E 02 1.1348E 00	-1.1213E 03 1.1128E-03	-1.901CE 03 4.5624E-04	1.0763E-02 -6.4338E 02	6.7586E-03 2.9656E-03	2.1700E-03 9.6022E 04	5.3491E 01
0.400	-9.5670E 02 1.1383E 00	5.3310E-01 -4.8457E-04	-1.897CE 03 -1.9324E-04	-3.0784E-02 -8.5614E 02	6.4259E-02 6.9607E-03	-8.4381E-03 9.6029E 04	5.8474E 01

TIME HISTORY  
CYCLE NO. = 1

PSI	T	TP	Z	ZP	R	BP
0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0
15.0	2.139E-01	-6.005E 00	-4.078E-04	-3.116E-03	-1.675E-04	-1.279E-02
30.0	-8.419E-01	-2.060E 00	-1.319E-03	-3.843E-03	-8.906E-04	-4.245E-03
45.0	-4.829E-01	4.802E 00	-1.825E-03	-2.238E-05	-1.907E-03	-3.517E-03
60.0	6.102E-01	3.548E 00	-1.508E-03	2.453E-03	-2.316E-03	3.937E-04
75.0	6.549E-01	-2.207E 00	-1.117E-03	5.223E-04	-2.010E-03	1.944E-03
90.0	-3.384E-01	-4.381E 00	-1.305E-03	-1.959E-03	-1.786E-03	-2.364E-04
105.0	-7.238E-01	1.437E 00	-1.652E-03	-6.954E-04	-2.010E-03	-1.473E-03
120.0	5.418E-02	4.506E 00	-1.420E-03	2.473E-03	-2.009E-03	1.477E-03
135.0	6.758E-01	7.439E-01	-7.594E-04	2.266E-03	-1.167E-03	4.955E-03
150.0	1.858E-01	-3.984E 00	-6.513E-04	-1.440E-03	3.544E-05	4.234E-03
165.0	-5.432E-01	-1.583E 00	-1.249E-03	-2.791E-03	7.705E-04	1.382E-03
180.0	-3.669E-01	2.038E 00	-1.079E-03	5.119E-04	1.038E-03	6.630E-04
195.0	4.415E-01	-1.890E 00	-5.811E-04	7.722E-04	1.356E-03	1.765E-03
210.0	-1.813E-01	-2.868E 00	-7.788E-04	-2.282E-02	1.869E-03	2.152E-03
225.0	-4.587E-01	7.482E-01	-1.260E-03	-1.392E-03	2.479E-03	1.245E-02
240.0	1.603E-02	2.878E 00	-1.244E-03	1.061E-03	2.365E-03	2.032E-05
255.0	4.274E-01	2.643E-01	-8.611E-04	1.562E-03	2.052E-03	-8.942E-04
270.0	1.253E-01	-3.573E 00	-7.572E-04	-6.159E-04	1.591E-03	-1.490E-03
285.0	-3.546E-01	-1.053E 00	-1.035E-03	-1.508E-03	9.712E-04	-2.038E-03
300.0	-2.353E-01	2.004E 00	-1.191E-03	3.167E-04	2.305E-04	-2.695E-03
315.0	2.457E-01	1.671E 00	-5.100E-04	1.831E-03	-4.685E-04	-2.964E-03
330.0	2.991E-01	-1.262E 00	-5.552E-04	5.734E-04	-1.019E-03	-2.376E-03
345.0	-1.215E-01	-1.951E 00	-6.809E-04	-1.228E-03	-1.547E-03	-1.830E-03
360.0						-2.201E-03

MINIMUM ABSOLUTE RESPONSE

PSI	T	TP	Z	ZP	R	BP
0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0
15.0		6.005E 00	1.825E-03	3.843E-03	2.479E-03	4.955E-03
45.0						
30.0						
240.0						
135.0						

TIME HISTORY  
CYCLE NO. = 5

PSI	T	TP	Z	ZP	R	BP
0.0	-9.679E-04	-7.764E-02	-2.451E-04	-1.986E-05	-1.426E-03	2.039E-02
15.0	-1.167E-02	-4.134E-03	-2.507E-04	-2.312E-05	-9.490E-04	2.366E-02
30.0	-3.118E-03	6.949E-02	-2.496E-04	3.155E-05	-2.060E-04	2.547E-03
45.0	9.594E-03	2.762E-02	-2.381E-04	5.120E-05	4.606E-04	2.545E-03
60.0	6.081E-03	-5.446E-02	-2.301E-04	1.521E-05	1.095E-03	2.298E-02
75.0	-6.833E-03	-4.420E-02	-2.256E-04	-1.544E-05	1.635E-03	1.828E-02
90.0	-8.018E-03	2.514E-02	-2.258E-04	9.943E-06	2.036E-03	1.236E-02
105.0	3.475E-03	5.267E-02	-2.228E-04	4.330E-05	2.273E-03	5.940E-04
120.0	9.536E-03	-1.400E-02	-2.139E-04	3.163E-05	2.339E-03	-1.040E-04
135.0	-1.347E-04	-5.224E-02	-2.105E-04	-1.275E-05	2.215E-03	-8.479E-04
150.0	-7.637E-02	-5.073E-03	-2.143E-04	-1.622E-05	1.903E-03	-1.532E-02
165.0	-2.374E-03	4.528E-02	-2.127E-04	2.850E-05	1.434E-03	-2.051E-03
180.0	6.178E-03	2.005E-02	-2.029E-04	4.668E-05	8.537E-04	-2.383E-02
195.0	4.364E-03	-3.351E-02	-1.956E-04	9.054E-06	2.790E-04	-2.542E-02
210.0	-3.964E-03	-2.971E-02	-1.973E-04	-2.180E-05	-6.528E-04	-2.514E-03
225.0	-5.174E-03	2.047E-02	-1.958E-04	2.035E-06	-1.080E-03	-2.280E-02
240.0	1.936E-03	3.385E-02	-1.947E-04	3.686E-05	-1.621E-03	-1.853E-02
255.0	5.384E-03	-7.500E-03	-1.861E-04	2.890E-05	-2.030E-03	-1.273E-03
270.0	-4.860E-07	-2.364E-02	-1.825E-04	-1.455E-06	-2.275E-03	-5.930E-04
285.0	-4.943E-03	-4.124E-03	-1.834E-04	-4.926E-06	-2.335E-03	1.327E-04
300.0	-1.604E-03	2.964E-02	-1.813E-04	2.079E-05	-2.206E-03	8.498E-04
315.0	4.049E-03	1.354E-02	-1.744E-04	3.227E-05	-1.899E-03	1.502E-02
330.0	2.861E-03	-2.262E-02	-1.688E-04	1.025E-05	-1.436E-03	2.029E-02
345.0	-2.727E-03	-2.007E-02	-1.685E-04	-8.348E-06	-0.589E-04	2.382E-03
360.0	-3.574E-03	1.361E-02	-1.690E-04	4.982E-06	-2.139E-04	2.546E-03

MAXIMUM ABSOLUTE RESPONSE

PSI	T	TP	Z	ZP	R	BP
15.0	1.167E-02	7.764E-02	2.507E-04	5.120E-05	3.339E-03	2.547E-03
9.0						
15.0						
45.0						
120.0						
10.0						

TEST CASE ALTITUDE=6000 FT

ITERATION COUNT=13	BETA	THETA	LAG ANGLE
AZIMUTH STA			
0.0	3.0050	-0.0000	0.0000
15.0	0.0017	-0.0582	0.0001
30.0	-0.0010	-0.0554	0.0001
45.0	-0.0073	-0.0539	0.0001
60.0	-0.0042	-0.0536	0.0000
75.0	-0.0046	-0.0533	0.0000
90.0	-0.0041	-0.0525	-0.0000
105.0	-0.0025	-0.0507	-0.0001
120.0	-0.0005	-0.0486	-0.0002
135.0	0.0019	-0.0493	-0.0002
150.0	0.0052	-0.0534	-0.0003
165.0	0.0089	-0.0574	-0.0003
180.0	0.0127	-0.0595	-0.0004
195.0	0.0163	-0.0611	-0.0003
210.0	0.0195	-0.0639	-0.0003
225.0	0.0219	-0.0663	-0.0002
240.0	0.0232	-0.0667	-0.0001
255.0	0.0236	-0.0653	-0.0001
270.0	0.0232	-0.0649	-0.0000
285.0	0.0217	-0.0655	0.0000
300.0	0.0192	-0.0662	0.0001
315.0	0.0160	-0.0649	0.0001
330.0	0.0124	-0.0631	0.0001
345.0	0.0087	-0.0619	0.0001

BLADE ANGLE OF ATTACK DISTRIBUTION

PS1	RACIAL STA.		MACH NUMBER	RACIAL STA.		PS1	RACIAL STA.		MACH NUMBER	RACIAL STA.	
	10.416	12.500		14.582	16.667		17.920	18.332		20.416	22.500
7.0	6.667	8.332	10.416	12.500	14.582	17.920	18.332	20.416	22.500	24.582	26.667
15.0	71.699	68.236	64.103	60.210	56.571	53.187	51.273	48.714	46.400	44.395	42.904
30.0	65.043	61.867	58.121	54.620	51.393	48.400	46.714	44.395	42.904	41.308	39.965
45.0	59.270	56.396	53.033	49.918	47.044	44.308	43.556	41.308	39.965	37.726	36.542
60.0	54.770	52.153	49.103	46.288	43.556	41.308	39.965	37.726	36.542	34.831	34.106
75.0	51.530	49.102	46.278	43.615	41.275	39.368	37.274	36.106	34.831	33.889	33.567
90.0	49.832	47.285	44.593	42.112	39.829	37.274	36.106	34.831	33.889	33.567	33.567
105.0	49.982	46.658	44.044	41.559	39.368	37.274	36.106	34.831	33.889	33.567	33.567
120.0	49.588	47.358	44.649	42.152	39.854	37.274	36.106	34.831	33.889	33.567	33.567
135.0	51.714	49.259	46.402	43.765	41.238	39.368	37.274	36.106	34.831	33.889	33.567
150.0	54.928	52.273	49.174	46.369	47.851	45.724	44.486	42.777	41.555	40.155	38.777
165.0	59.323	56.405	52.982	49.805	51.561	49.155	47.777	46.155	44.777	43.444	42.155
180.0	65.013	61.800	57.999	54.445	56.413	53.715	52.166	50.666	49.222	47.833	46.500
195.0	71.808	68.321	64.144	60.537	62.587	59.377	57.639	55.955	54.322	52.733	51.188
210.0	79.064	75.384	70.903	66.597	68.588	65.704	63.787	61.922	60.111	58.355	56.644
225.0	85.965	82.293	77.544	72.568	75.541	72.037	69.978	67.966	65.911	63.822	61.700
240.0	91.896	88.149	83.437	78.754	81.388	77.768	75.520	73.444	71.333	69.188	67.011
255.0	96.484	92.757	88.110	83.351	87.088	82.391	80.201	78.044	75.822	73.544	71.211
270.0	99.413	95.781	91.133	86.417	90.101	85.414	83.209	81.044	78.811	76.511	74.188
285.0	100.418	96.802	92.164	87.448	91.133	86.417	84.209	82.044	79.811	77.511	75.188
300.0	99.436	95.785	91.116	86.385	89.660	85.044	82.822	80.644	78.444	76.111	73.722
315.0	96.591	92.870	88.148	83.407	86.660	82.044	79.811	77.511	75.188	72.866	70.544
330.0	92.044	88.258	83.514	78.816	81.229	77.044	74.811	72.511	70.188	67.866	65.544
345.0	86.015	82.226	77.554	73.066	75.435	71.666	69.400	67.111	64.822	62.544	60.266
	78.977	75.293	70.829	66.560	62.820	58.725	56.567	54.411	52.255	50.100	47.944

MACH NUMBER DISTRIBUTION

PS1	RACIAL STA.		MACH NUMBER	RACIAL STA.		PS1	RACIAL STA.		MACH NUMBER	RACIAL STA.	
	10.416	12.500		14.582	16.667		17.920	18.332		20.416	22.500
7.0	6.667	8.332	10.416	12.500	14.582	17.920	18.332	20.416	22.500	24.582	26.667
15.0	2.507	2.555	2.627	2.713	2.810	2.917	3.034	3.161	3.298	3.445	3.602
30.0	2.611	2.676	2.768	2.871	2.984	3.107	3.230	3.363	3.506	3.659	3.822
45.0	2.740	2.819	2.927	3.045	3.171	3.304	3.442	3.589	3.746	3.913	4.089
60.0	2.869	2.959	3.078	3.206	3.341	3.482	3.631	3.788	3.954	4.129	4.313
75.0	2.978	3.074	3.207	3.336	3.477	3.624	3.774	3.933	4.101	4.278	4.464
90.0	3.074	3.175	3.308	3.447	3.592	3.742	3.894	4.056	4.227	4.407	4.596
105.0	3.166	3.276	3.414	3.557	3.704	3.854	4.006	4.166	4.334	4.511	4.696
120.0	3.254	3.365	3.501	3.644	3.794	3.948	4.106	4.271	4.444	4.624	4.811
135.0	3.338	3.448	3.585	3.726	3.874	4.026	4.184	4.351	4.526	4.709	4.898
150.0	3.418	3.528	3.665	3.806	3.954	4.106	4.264	4.431	4.606	4.789	4.978
165.0	3.494	3.604	3.741	3.882	4.029	4.181	4.338	4.504	4.679	4.861	5.048
180.0	3.566	3.676	3.813	3.954	4.101	4.254	4.411	4.578	4.754	4.939	5.131
195.0	3.634	3.744	3.885	4.026	4.173	4.324	4.481	4.648	4.824	5.009	5.201
210.0	3.698	3.808	3.945	4.094	4.241	4.394	4.551	4.718	4.894	5.079	5.271
225.0	3.758	3.868	3.995	4.154	4.301	4.454	4.611	4.778	4.954	5.139	5.331
240.0	3.814	3.924	4.051	4.214	4.361	4.514	4.671	4.838	5.014	5.199	5.391
255.0	3.866	3.976	4.103	4.274	4.421	4.574	4.731	4.898	5.074	5.259	5.451
270.0	3.914	4.024	4.151	4.334	4.481	4.634	4.791	4.958	5.134	5.319	5.511
285.0	3.958	4.068	4.195	4.394	4.541	4.694	4.851	5.018	5.194	5.379	5.571
300.0	4.000	4.110	4.241	4.454	4.601	4.754	4.911	5.078	5.254	5.439	5.631
315.0	4.038	4.148	4.281	4.514	4.661	4.814	4.971	5.138	5.314	5.499	5.691
330.0	4.072	4.182	4.313	4.574	4.721	4.874	5.031	5.198	5.374	5.559	5.751
345.0	4.102	4.212	4.345	4.634	4.781	4.934	5.091	5.258	5.434	5.619	5.811

(FORCE ALONG FLIGHT PATH)CALC= 13605. (FORCE NORMAL TO FLIGHT PATH)CALC= 6213. ALFAK= 63.24(DEG)

CONTROL INPUT  
 FEATHERING (DEG) = -2.766  
 STEADY CYCLIC(COS) = 0.0  
 CYCLIC(SIN) = 0.0

THRUST: 14945.0      WFORCE= 575.2  
         3.8            YFORCE= 119.5  
         CT= 0.28208      CH= 0.01053  
         CP= 0.00008      CY= 0.00226

MOMENT ABOUT Y AXIS = 4953.79 FT LB  
MOMENT ABOUT X AXIS = -21052.02 FT LB

TIME HISTORY

TIME (SEC)	U (FT/SEC) THETA (RAD)	V (FT/SEC) PHI (RAD)	W (FT/SEC) PSI (RAD)	P (RAD/SEC) X (FT)	Q (RAD/SEC) Y (FT)	R (RAD/SEC) Z (FT)	CMEGA (RAD/SEC)
0.400	-9.5670E 02 1.1383E 00	5.3310E-01 -4.8457E-04	-1.8970E 03 -1.9324E-04	-3.0784E-02 -8.5614E 02	6.4250E-02 4.9607E-03	-8.4381E-03 9.6029E 04	5.8474E 01
0.500	-9.6011E 02 1.1344E 00	3.9020E 01 -3.7918E-02	-1.8854E 03 -1.5414E-02	-4.3962E-01 -1.0680E 03	-1.3849E-01 1.0638E-02	-1.2145E-01 9.6036E 04	5.2364E 01

TIME HISTORY  
CYCLE NO. = 1

PSI	T	TP	Z	ZP	R	BP
0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0
15.0	2.119E-01	-6.020E 00	-4.037E-04	-3.100E-03	-1.700E-04	-1.299E-03
30.0	-9.436E-01	-2.044E 00	-1.211E-03	-3.817E-03	-6.989E-04	-4.269E-03
45.0	-4.788E-01	4.831E 00	-1.811E-03	-1.765E-04	-1.916E-03	-3.517E-03
60.0	6.152E-01	3.527E 00	-1.490E-03	2.451E-03	-2.325E-03	4.055E-04
75.0	6.507E-01	-3.255E 00	-1.104E-03	4.991E-04	-2.620E-03	1.931E-03
90.0	-3.469E-01	-4.366E 00	-1.257E-03	-1.969E-03	-1.802E-03	-2.659E-04
105.0	-7.218E-01	1.502E 00	-1.642E-03	-6.668E-04	-2.028E-03	-1.462E-03
120.0	6.520E-02	4.910E 00	-1.402E-03	2.498E-03	-2.018E-03	1.537E-02
135.0	6.777E-01	1.656E-01	-7.627E-04	2.233E-03	-1.164E-03	4.991E-03
150.0	1.741E-01	-4.017E 00	-6.655E-04	-1.490E-03	4.064E-05	4.208E-03
165.0	-5.457E-01	-1.513E 00	-1.243E-03	-2.772E-03	7.688E-04	1.355E-02
180.0	-3.426E-01	3.095E 00	-1.531E-03	5.736E-04	1.036E-03	6.870E-04
195.0	3.776E-01	2.457E 00	-1.059E-03	3.032E-03	1.363E-03	1.810E-03
210.0	4.348E-01	-1.970E 00	-5.706E-04	7.013E-04	1.884E-03	2.169E-02
225.0	-1.949E-01	-2.841E 00	-7.857E-04	-2.306E-03	2.329E-03	1.233E-03
240.0	-4.567E-01	8.408E-01	-1.257E-03	-1.234E-03	2.491E-03	5.216E-04
255.0	3.078E-02	2.883E 00	-1.249E-03	1.400E-03	2.374E-03	-9.035E-04
270.0	4.306E-01	1.768E-01	-8.600E-04	1.523E-03	2.059E-03	-1.500E-03
285.0	1.112E-01	-2.611E 00	-7.235E-04	-6.637E-04	1.593E-03	-2.057E-03
300.0	-3.628E-01	-1.010E 00	-1.334E-03	-1.481E-03	9.689E-04	-2.714E-03
315.0	-2.240E-01	2.071E 00	-1.178E-03	3.802E-04	2.258E-04	-2.962E-03
330.0	2.580E-01	1.611E 00	-8.855E-04	1.826E-03	-4.714E-04	-2.364E-03
345.0	2.922E-01	-1.350E 00	-5.849E-04	5.013E-04	-1.023E-03	-1.849E-03
360.0	-1.364E-01	-1.924E 00	-6.840E-04	-1.259E-03	-1.559E-03	-2.245E-03

MAXIMUM ABSOLUTE RESPONSE

PSI	T	TP	Z	ZP	B	BP
0.0	1.000E 00	6.020E 00	1.811E-03	3.817E-03	2.491E-03	4.991E-03
15.0						
45.0						
30.0						
240.0						
135.0						

TIME HISTORY  
CYCLE NO. = 5

PSI	Y	TP	Z	ZP	B	BP
0.0	-3.187E-03	-7.667E-02	-2.448E-04	-2.724E-05	-1.430E-03	2.031E-03
15.0	-1.198E-02	9.482E-03	-2.508E-04	-1.888E-05	-8.550E-04	2.363E-03
30.0	-1.150E-03	7.727E-02	-2.482E-04	3.545E-05	-2.114E-04	2.553E-03
45.0	1.056E-02	1.616E-02	-2.367E-04	4.996E-05	4.568E-04	2.552E-03
60.0	4.561E-03	-6.156E-02	-2.289E-04	9.323E-06	1.032E-03	2.298E-03
75.0	-8.260E-03	-2.599E-02	-2.293E-04	-1.228E-05	1.632E-03	1.827E-03
90.0	-7.076E-03	4.503E-02	-2.290E-04	1.478E-05	2.033E-03	1.243E-03
105.0	5.151E-03	4.838E-02	-2.212E-04	4.457E-05	2.275E-03	6.052E-04
120.0	8.249E-03	-2.471E-02	-2.120E-04	2.947E-05	2.342E-03	-9.937E-05
135.0	-1.786E-03	-5.195E-02	-2.110E-04	-1.783E-05	2.217E-03	-8.508E-04
150.0	-7.947E-03	4.844E-03	-2.118E-04	-1.195E-05	1.905E-03	-1.533E-03
165.0	-9.685E-04	4.843E-02	-2.118E-04	3.522E-05	1.437E-03	-2.045E-03
180.0	6.944E-03	1.202E-02	-2.013E-04	4.477E-05	8.577E-04	-2.378E-03
195.0	3.341E-03	-3.954E-02	-1.953E-04	1.618E-06	2.135E-04	-2.543E-03
210.0	-5.012E-03	-2.428E-02	-1.980E-04	-2.279E-05	-4.489E-04	-2.518E-03
225.0	-4.590E-03	2.751E-02	-1.999E-04	8.262E-06	-1.077E-03	-2.284E-03
240.0	3.086E-03	3.120E-02	-1.936E-04	3.990E-05	-1.619E-03	-1.897E-03
255.0	5.221E-03	-1.457E-02	-1.895E-04	2.502E-05	-2.030E-03	-1.277E-03
270.0	-1.143E-03	-3.366E-02	-1.825E-04	-5.002E-06	-2.275E-03	-5.972E-04
285.0	-5.172E-03	2.881E-03	-1.835E-04	-2.651E-06	-2.336E-03	1.288E-04
300.0	-6.099E-04	2.157E-02	-1.866E-04	2.464E-05	-2.208E-03	8.471E-04
315.0	4.595E-03	7.791E-03	-1.794E-04	3.089E-05	-1.901E-03	1.500E-03
330.0	2.116E-03	-2.673E-02	-1.686E-04	5.454E-06	-1.440E-03	2.027E-03
345.0	-3.498E-03	-1.615E-02	-1.691E-04	-9.174E-06	-8.627E-04	2.380E-03
360.0	-3.156E-03	1.875E-02	-1.692E-04	8.693E-06	-2.178E-04	2.547E-03

MAXIMUM ABSOLUTE RESPONSE

PSI	Y	TP	Z	ZP	B	BP
15.0	1.195E-02	7.667E-02	2.908E-04	4.996E-05	2.342E-03	2.553E-03
30.0						
45.0						
60.0						
75.0						
90.0						
105.0						
120.0						
135.0						
150.0						
165.0						
180.0						
195.0						
210.0						
225.0						
240.0						
255.0						
270.0						
285.0						
300.0						
315.0						
330.0						
345.0						
360.0						

TEST CASE ALTITUDE=56000 FT

ITERATION COUNT=11	BETA	THETA	LAG ANGLE
AZIMUTH STA			
0.0	0.089E	-0.0602	0.0005
15.0	0.0971	-0.0582	0.0011
30.0	0.0984	-0.0557	0.0015
45.0	0.0937	-0.0541	0.0016
60.0	0.0830	-0.0538	0.0013
75.0	0.0672	-0.0535	0.0008
90.0	0.0475	-0.0528	0.0001
105.0	0.0245	-0.0511	-0.0006
120.0	0.0012	-0.0490	-0.0012
135.0	-0.0218	-0.0458	-0.0014
150.0	-0.0428	-0.0537	-0.0014
165.0	-0.0601	-0.0576	-0.0012
180.0	-0.0724	-0.0556	-0.0007
195.0	-0.0790	-0.0612	-0.0003
210.0	-0.0805	-0.0637	0.0001
225.0	-0.0755	-0.0659	0.0002
240.0	-0.0647	-0.0662	0.0000
255.0	-0.0490	-0.0649	-0.0003
270.0	-0.0294	-0.0644	-0.0007
285.0	-0.0072	-0.0652	-0.0011
300.0	0.0160	-0.0654	-0.0013
315.0	0.0385	-0.0642	-0.0012
330.0	0.0597	-0.0625	-0.0008
345.0	0.0770	-0.0613	-0.0002

BLADE ANGLE OF ATTACK DISTRIBUTION

PSI	10.416	12.500	14.583	16.667	17.920
0.0	6.667	8.333	10.000	11.667	13.333
15.0	70.791	67.073	62.627	58.425	54.521
30.0	63.637	60.289	56.351	52.653	49.216
45.0	57.945	54.957	51.564	48.402	45.459
60.0	53.736	51.140	48.133	45.372	42.844
75.0	50.983	48.649	45.951	43.478	41.214
90.0	49.557	47.388	44.881	42.564	40.480
105.0	49.317	47.216	44.789	42.566	40.522
120.0	50.188	48.062	45.606	42.356	41.256
135.0	55.047	52.126	49.881	47.287	44.911
150.0	59.068	56.296	53.079	50.123	48.618
165.0	64.466	61.313	57.627	54.219	51.758
180.0	71.208	67.670	63.475	60.889	58.773
195.0	78.702	74.871	70.239	66.826	64.928
210.0	85.996	82.042	77.152	72.984	71.394
225.0	92.244	88.331	83.389	78.457	77.417
240.0	96.945	93.157	88.294	83.352	81.405
255.0	99.831	96.162	91.405	86.511	84.253
270.0	100.759	97.145	92.440	87.574	85.618
285.0	99.745	96.099	91.359	86.466	84.490
300.0	96.901	93.146	88.294	83.326	81.336
315.0	92.301	88.403	83.436	78.421	77.468
330.0	86.054	82.060	77.066	72.142	73.260
345.0	78.588	74.639	69.813	65.166	67.745

MACH NUMBER DISTRIBUTION

PSI	10.416	12.500	14.583	16.667	17.920
0.0	6.667	8.333	10.000	11.667	13.333
15.0	2.357	2.399	2.465	2.742	2.810
30.0	2.468	2.532	2.727	2.964	3.041
45.0	2.784	2.701	2.813	3.199	3.284
60.0	2.932	2.878	3.004	3.424	3.514
75.0	3.039	3.035	3.170	3.613	3.707
90.0	3.090	3.142	3.289	3.746	3.842
105.0	3.075	3.201	3.345	3.808	3.905
120.0	2.997	3.186	3.329	4.525	4.618
135.0	2.869	3.104	3.244	4.411	4.502
150.0	2.710	2.799	3.101	4.217	4.304
165.0	2.549	2.623	2.919	3.965	4.047
180.0	2.416	2.469	2.725	3.691	3.764
195.0	2.333	2.363	2.549	3.430	3.492
210.0	2.309	2.314	2.414	3.216	3.263
225.0	2.232	2.316	2.322	3.026	3.102
240.0	2.379	2.346	2.319	2.994	3.011
255.0	2.423	2.379	2.314	2.970	2.974
270.0	2.445	2.396	2.307	2.972	2.967
285.0	2.434	2.387	2.305	2.969	2.967
300.0	2.396	2.356	2.314	2.908	2.919
315.0	2.344	2.318	2.301	2.838	2.838
330.0	2.304	2.297	2.301	2.834	2.834
345.0	2.302	2.319	2.356	2.831	2.831

AE.FAR= 62.97( DEG)

0.061.

(FORCE ALONG FLIGHT PATH)CALC= 12579. (FORCE NORMAL TO FLIGHT PATH)CALC= 0.061.

CONTROL INPUT  
 FEATHERING (DEG) = -2.766  
 STEADY CYCLIC(COS) = 0.0  
 CYCLIC(SIN) = 0.0

THRUST= 14141.2      XFORCE= -44.6  
HP= 57.8              YFORCE= -230.3  
CT= 0.26796          CH=-0.00065  
CP= 0.00055          CY=-0.00436

MOMENT ABOUT Y AXIS = -123845.75 FT LB  
MOMENT ABOUT X AXIS = 57999.87 FT LB

## TIME HISTORY

T(SEC)	U(FT/SEC) THETA(RAD)	V(FT/SEC) PHI(RAD)	W(FT/SEC) PSI(RAD)	P(RAD/SEC) X(FT)	Q(RAD/SEC) Y(FT)	R(RAD/SEC) Z(FT)	OMEGA(RAD/SEC)
0.500	-9.6011E 02 3.1344E 00	3.9020E C1 -3.7918E-C2	-1.8834E 03 -1.5414E-02	-4.3962E-01 -1.0680E 03	-1.3849E-01 1.0638E-02	-1.2143E-C1 9.6036E C4	5.9364E 01
0.600	-1.2122E 03 9.9276E-01	2.4634E C1 -1.3923E-C2	-1.7247E 03 1.7796E-04	6.5332E-01 -1.2791E 03	-2.6689E 00 2.9586E-02	1.9142E-C1 9.6043E C4	5.9653E 01

TIME HISTORY  
CYCLE NO. = 1

PSI	T	TP	Z	ZP	B	BP
0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0
15.0	2.139E-01	-6.005E 00	-3.537E-04	-2.702E-03	-1.976E-04	-1.310E-02
30.0	-8.460E-01	-2.092E 00	-1.149E-03	-3.372E-03	-9.881E-04	-4.528E-02
45.0	-4.903E-01	4.810E 00	-1.591E-03	-6.628E-04	-2.061E-03	-3.672E-02
60.0	6.127E-01	3.617E 00	-1.304E-03	2.201E-03	-2.501E-03	3.146E-04
75.0	6.683E-01	-3.152E 00	-9.552E-04	4.617E-04	-2.213E-03	1.888E-02
90.0	-3.346E-01	-4.470E 00	-1.131E-03	-1.804E-03	-2.000E-03	-2.635E-04
105.0	-7.388E-01	1.382E 00	-1.453E-03	-6.551E-04	-2.221E-03	-1.429E-03
120.0	4.302E-02	4.591E 00	-1.240E-03	2.280E-03	-2.195E-03	1.610E-02
135.0	6.807E-01	3.417E-01	-6.578E-04	2.168E-03	-1.303E-03	5.183E-03
150.0	2.035E-01	-4.048E 00	-5.402E-04	-1.269E-03	-4.157E-03	4.557E-02
165.0	-5.511E-01	-1.716E 00	-1.055E-03	-2.661E-03	7.488E-04	1.581E-03
180.0	-3.751E-01	3.050E 00	-1.353E-03	3.820E-04	1.071E-03	8.807E-04
195.0	3.677E-01	2.615E 00	-5.262E-04	2.878E-03	1.447E-03	1.991E-03
210.0	4.662E-01	-1.863E 00	-4.391E-04	8.427E-04	2.011E-03	2.317E-03
225.0	-1.736E-01	-3.025E 00	-6.091E-04	-2.141E-03	2.490E-03	1.344E-03
240.0	-4.828E-01	6.227E-01	-1.077E-03	-1.434E-03	2.677E-03	8.447E-05
255.0	-1.175E-02	3.017E 00	-1.106E-03	1.211E-03	2.573E-03	-8.831E-04
270.0	4.471E-01	4.079E-01	-7.457E-04	1.944E-03	2.254E-03	-1.552E-02
285.0	1.512E-01	-2.668E 00	-6.077E-04	-4.900E-04	1.767E-03	-2.169E-03
300.0	-3.657E-01	-1.280E 00	-8.640E-04	-1.469E-03	1.107E-03	-2.871E-03
315.0	-2.663E-01	2.939E 00	-1.035E-03	1.651E-04	3.184E-04	-3.153E-03
330.0	2.464E-01	1.878E 00	-7.500E-04	1.704E-03	-4.298E-04	-2.563E-03
345.0	3.314E-01	-1.229E 00	-4.817E-04	6.511E-04	-1.030E-03	-2.024E-03
360.0	-1.111E-01	-2.151E 00	-5.407E-04	-1.102E-03	-1.614E-03	-2.435E-03

PSI	T	TP	Z	ZP	B	BP
0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0
15.0	6.005E 00	1.591E-03	3.372E-03	2.667E-03	5.183E-03	5.183E-03
45.0						
30.0						
240.0						
135.0						

TYPE HISTORY  
CYCLE NO. = 5

PSI	T	TP	Z	ZP	B	BP
0.0	2.893E-03	-1.050E-01	-2.091E-04	-1.443E-05	-1.578E-03	2.186E-03
15.0	-1.497E-02	-3.147E-02	-2.161E-04	-3.892E-05	-9.598E-04	2.538E-03
30.0	-7.878E-03	8.567E-02	-2.186E-04	1.974E-05	-2.690E-04	2.739E-03
45.0	1.104E-02	5.886E-02	-2.686E-04	5.663E-05	4.514E-04	2.764E-03
60.0	1.106E-02	-5.871E-02	-1.583E-04	2.210E-05	1.143E-03	2.522E-03
75.0	-6.445E-03	-7.504E-02	-1.578E-04	-1.610E-05	1.738E-03	2.017E-03
90.0	-1.257E-02	2.826E-02	-2.003E-04	-1.470E-06	2.181E-03	1.370E-03
105.0	1.475E-03	7.903E-02	-1.546E-04	4.508E-05	2.450E-03	6.837E-04
120.0	1.204E-02	1.641E-03	-1.831E-04	4.289E-05	2.732E-03	-5.086E-05
135.0	2.557E-03	-7.103E-02	-1.793E-04	-1.392E-05	2.414E-03	-8.533E-04
150.0	-9.750E-03	-2.604E-02	-1.855E-04	-3.360E-05	2.091E-03	-1.616E-03
165.0	-5.934E-03	5.520E-02	-1.876E-04	1.770E-05	1.592E-03	-2.198E-03
180.0	6.884E-03	4.272E-02	-1.779E-04	5.649E-05	9.682E-04	-2.565E-03
195.0	7.873E-03	-2.517E-02	-1.679E-04	2.019E-05	2.734E-04	-2.743E-03
210.0	-3.404E-03	-5.058E-02	-1.692E-04	-3.017E-05	-4.427E-04	-6.727E-03
225.0	-8.207E-03	1.429E-02	-1.750E-04	-1.410E-05	-1.126E-03	-2.423E-02
240.0	4.031E-04	5.149E-02	-1.722E-04	3.518E-05	-1.719E-03	-2.043E-03
255.0	7.711E-03	4.339E-03	-1.626E-04	3.856E-05	-2.174E-03	-1.425E-03
270.0	2.244E-03	-4.625E-02	-1.574E-04	5.623E-07	-2.451E-03	-6.943E-04
285.0	-6.401E-03	-1.964E-02	-1.593E-04	-1.492E-05	-2.530E-03	8.959E-05
300.0	-4.217E-03	2.633E-02	-1.555E-04	1.337E-05	-2.405E-03	8.679E-04
315.0	4.531E-03	3.050E-02	-1.529E-04	3.751E-05	-2.084E-03	1.582E-03
330.0	5.697E-03	-2.312E-02	-1.456E-04	1.757E-05	-1.593E-03	2.166E-02
345.0	-2.261E-03	-3.614E-02	-1.450E-04	-1.256E-05	-9.748E-04	2.559E-03
360.0	-5.875E-03	8.235E-03	-1.473E-04	-5.179E-06	-2.804E-04	2.746E-03

MAXIMUM ABSOLUTE RESPONSE

PSI	T	TP	Z	ZP	B	BP
15.0	1.497E-02	1.050E-01	2.091E-04	-1.443E-05	-1.578E-03	2.186E-03
30.0						
45.0				5.663E-05	2.532E-03	2.764E-03
120.0						
45.0						

TEST CASE ALTITUDE=5000 FT  
BETA GREATER THAN 50 DEGREES CONDITION DISCONTINUED