A COMPUTER PROGRAM FOR CALCULATING SYMMETRICAL AERODYNAMIC CHARACTERISTICS AND LATERAL-DIRECTIONAL STABILITY DERIVATIVES OF WING-BODY COMBINATIONS WITH BLOWING JETS

C. Edward Lan and Sudhir C. Mehrotra, University of Kansas and Charles H. Fox, Jr., NASA Langley Research Center

March 1978
A COMPUTER PROGRAM FOR CALCULATING SYMMETRICAL AERODYNAMIC CHARACTERISTICS
AND LATERAL-DIRECTIONAL STABILITY DERIVATIVES OF WING-BODY COMBINATIONS
WITH BLOWING JETS

By

C. Edward Lan
Sudhir C. Mehrotra
University of Kansas

and

Charles H. Fox, Jr.
NASA Langley Research Center

INTRODUCTION

This document describes in detail the necessary information for using a computer program to calculate the aerodynamic characteristics under symmetrical flight conditions and the lateral-directional stability derivatives of wing-body combinations with upper-surface-blowing (USB) or over-wing-blowing (OWB) jets. This program is an updated version of that described in NASA TM X-73987 (reference 1). In addition to the features and restrictions described in reference 1, the following new features have been added to the program: (1) A fuselage of arbitrary body of revolution has been included. The effect of wing-body interference can now be investigated. (2) All nine lateral-directional stability derivatives can be calculated.

The program is written in Fortran language and runs on CDC Cyber 175 and Honeywell 66/60 computers. It is available from COSMIC of the University of Georgia, Athens, Georgia.
SYMBOLS

\( A_j \)  
\( C_T \)  
\( M_j \)  
\( M_\infty \)  
\( P_{tj} \)  
\( P_\infty \)  
\( q \)  
\( r(x) \)  
\( S_w \)  
\( T_j \)  
\( T_\infty \)  
\( V_j \)  
\( V_\infty \)  
\( AR \)  
\( L.E. \)  
\( T.E. \) 

cross sectional area of the jet
thrust coefficient = thrust/\( q_S \)
Mach number of the jet
Mach number of the freestream
jet total pressure
static pressure
freestream dynamic pressure
fuselage radius as a function of \( x \)
wing area
static temperature of the jet in °R or °K
freestream static temperature in °R or °K
jet velocity
freestream velocity
wing aspect ratio
leading edge
trailing edge
\( \rho_j \) \hspace{1cm} \text{jet density} \\
\( \rho_\infty \) \hspace{1cm} \text{freestream density} \\
\( \gamma \) \hspace{1cm} \text{ratio of specific heats}
Description of New Program Features

The program can be run without the fuselage, in exactly the same manner as described in reference 1. Therefore, all instructions concerning the preparation of wing-jet geometry in reference 1 are still applicable. When a fuselage is present, the coordinate origin should be assumed on the fuselage axis, with the positive x-axis coincident with the fuselage axis and pointing downstream. The wing and jet geometry should be defined accordingly. The jet is not allowed to wash the fuselage in the present program. Some restrictions in preparing the fuselage geometry are described below.

(i) The fuselage must be a body of revolution; but otherwise, arbitrary axial distribution of cross-sectional area is allowed. No fuselage camber effect is included. For arbitrary bodies, their equivalent bodies of revolution may be used.

(ii) The wing chord along the wing-body juncture is best to be parallel to the freestream. The wing planform as described by the input data should not penetrate into the fuselage.

(iii) The fuselage geometry can be described to the program by providing \( r(x) \) analytically to the function subprogram \( \text{FUR}(x) \) and \( \frac{dr}{dx} \) to the function subprogram \( \text{SLOP}(x) \). Alternatively, the radii at a finite number of stations (restricted to be 21 or less) can be input.

Since the fuselage aft body is greatly influenced by the displaced wake, and since the wake displacement is not accounted for in the program, the fuselage contribution to lift and pitching moment may not be accurate. However,
the fuselage lift is known to be small in most cases and can therefore be neglected.

When the lateral-directional stability derivatives are to be calculated, the program will always start to compute the symmetrical aerodynamic characteristics first, as some of these derivatives depend on the symmetrical flight conditions. Therefore, it is not possible for the program to calculate these derivatives only, without calculating the symmetrical loading at the same time. As has been shown previously (reference 2), the fuselage contribution to forces and moments is very much affected by the viscous effect. More accurate evaluation of the fuselage contribution to the derivatives can be made if some last portion of the fuselage is not included in the force and moment integrations (reference 2). This is done in the present program by providing a value to the input variable "X1" which is related empirically to the last station to be included in the force and moment integrals. If it is not exactly clear from the geometry of the equivalent body of revolution what value of "X1" should be input, a value of 0.75 - 0.85 for fuselages with upswept after body and 1.0 for others should provide reasonable results under usual circumstances.

The total number of vortices representing the wing can be determined with the following equation:

\[
\text{LPANEL} = \left( \text{NW}(1) + \text{NW}(2) + \text{NW}(3) \right) \times \left[ \sum_{I=1}^{M} (\text{M}(I) - 1) \right]
\]

where the input variables appearing on the right hand side are defined in
the section under Input Data Format. Since the wing-body interference is accounted for through the matching of Fourier components of the induced velocities on the fuselage surface, the number of additional unknowns due to the presence of the fuselage is equal to the product of the number of Fourier components "NT" used and the number of stations "NF" at which the body boundary condition is to be satisfied. Therefore, the total number of unknowns to be solved for the wing-body alone without the jet is

\[ LWF = \text{LPANEL} + NT \times NF \]

LPANEL is limited to 100 and LWF to 130. For good results, NT can be set to 2 and NF to 12-14.

The number of vortex elements used to represent the outside (or inside) of the jet surface can be computed as follows:

**Centered Jet**

\[ \text{JPANEL} = \left[ \sum_{I=1}^{NNJ} \text{NCJ}(I) \right] \times [NSJ-1] \]

**Outboard Jet**

\[ \text{JPANEL} = \left[ \sum_{I=1}^{NNJ} \text{NCJ}(I) \right] \times [NSJ+1] \]

For wing-body configurations, the jet should be considered as non-centered. The number of unknowns to be solved without the fuselage is, again, (reference 1)
\[ L_{TOTAL} = L_{PANEL} + 2 \times JPANEL \]

With the fuselage included, the total number of unknowns becomes

\[ LWFJ = LWF + 2 \times JPANEL \]

where JPANEL is limited to 100, or such that \( L_{PANEL} + JPANEL \) is less than 200. \( L_{TOTAL} \) is limited to 300 and \( LWFJ \) to 330. \( LWFJ \) is the number to be used to calculate the array size for \( GAMMA(I) \) to be mentioned later.
INPUT DATA FORMAT

Group 1. Format 13A6 1 card
Any title identifying the cases to be run.

Group 2. Format 3(6X,14) 1 card
ICASE Number of cases to be run.
NG = 0 if all cases have the same geometry other than
the angle of attack.
= 1 if new configurations or different freestream–
jet velocity ratios are to be treated.
ISYM = 0 for a centered jet
= 1, otherwise.
LAT = 0 for symmetrical aerodynamic characteristics only.
= 1 for lateral-directional stability derivatives in
addition to symmetrical aerodynamic characteristics.

Group 3. Format 8F10.5 1 card
AM1 Mach number of the freestream
AM2 Mach number of the jet flow
VMU Freestream velocity divided by jet velocity.
TEMP Jet static temperature divided by freestream static
temperature. Assumed to be the same as ratio of
freestream density and jet density.
ALP Angle of attack in degrees.
XEL X-coordinate of the wing L.E. at the jet centerline.
XET X-coordinate of the wing T.E. at the jet centerline.
Note: If the thrust coefficient is given, VMU may be computed as

\[
\frac{V_j}{V_\infty} = \frac{1}{2} \left\{ 1 + \left[ 1 + \frac{2C_T S_w}{A_j \rho_j / \rho_\infty} \right]^{1/2} \right\}.
\]

VMU = \frac{V_\infty}{V_j}

where \( C_T = \) thrust coefficient

\( S_w = \) wing area used to define \( C_T \).

\( A_j = \) jet cross-sectional area

When the thrust coefficient is computed with the static thrust, the following formula for \( \frac{V_j}{V_\infty} \) is preferred:

\[
\frac{V_j}{V_\infty} = \left[ \frac{C_T (S_w / 2)}{\rho_j / \rho_\infty} \right]^{1/2}.
\]

If the nozzle pressure ratio, \( \frac{p_{_{\text{to},j}}}{p_\infty} \), is given, the following isentropic relations may be used.

\[
M_j^2 = \frac{2}{\gamma - 1} \left[ \frac{p_{_{\text{to},j}}}{p_\infty} \right]^{\frac{\gamma - 1}{\gamma}} - 1.
\]
\[
\frac{T_j}{T_\infty} = \frac{1 + \frac{\gamma-1}{2} \frac{M_\infty^2}{M_j^2}}{1 + \frac{\gamma-1}{2} \frac{M_\infty^2}{M_j^2}}
\]

\[
\frac{V_\infty}{V_j} = VMU = \frac{M_\infty}{M_j} - \frac{1}{(\frac{T_j}{T_\infty})^{1/2}}
\]

Group 4. Format 2(6X, I4) 5F10.5

NFP   Number of flap sections, including the jet span.

A maximum of five flap sections may be input.

NJP   Numerical order of the jet span among the NFP sections.

DF(I) Flap deflection angles in degrees for the flap sections.

I=1, NFP

Group 5. Format 7F10.5 1 card

HALFSW One half of the reference wing area.

CREF Reference chord

TWIST Difference in angles of attack at the tip and the root in deg. Negative for washout.

TWISTR Incidence angle of the root chord in degrees.

XJ  X, Y, and Z-coordinates of the midpoint of the jet cross-section at the exit. ZJ is referred to the wing plane.

YJ

ZJ

RJ Jet radius.
Note: The last four variables are needed only for over-wing-blowing applications. They may be any non-zero numbers for USB applications, unless the rectangular jet is not on the wing surface and the entrainment effect is to be accounted for. For the latter case, these variables are used to define the equivalent circular jet.

Group 6. Format 7F10.5 1 card

TEANGL  Trailing-edge half angle of the airfoil at the jet center-line in deg. For USB applications, it may be arbitrary.

PTIAL  = 0. for clean or full-span flap configuration
       = 1. for partial-span flap deflection.

USB  = 1. for USB applications
       = 0. for OWB applications

CAMLER L.E. camber slope at the root leading edge

CAMLET L.E. camber slope at the tip leading edge.

CAMTER T.E. camber slope at the root trailing edge

CAMTET T.E. camber slope at the tip trailing edge.

Note: For USB applications, TEANGL may be any value. If the camber ordinates are to be read in, the leading edge and trailing edge camber slopes may be arbitrary numbers.

Note: The following card must be omitted for OWB applications.

Group 7 Format 3F10.5 1 card

CMU  Jet thrust coefficient

DFJ  Jet deflection angle in degrees at the trailing edge relative to the chord line. At small flap angles, it may be taken as
the sum of flap angle and the airfoil trailing edge half angle. At large flap angles, experimental values should be used.

TNJ

= 0. if the entrainment is not to be accounted for. Usually this is the case if the jet is on the wing surface.

= 1. if the entrainment due to an equivalent round jet is to be accounted for when a rectangular jet is not on the wing surface.

Group 8 Format 8(6X, I4) 1 card

NC Number of spanwise sections. A natural way of dividing a planform into sections is to follow lines of discontinuity, such as edges of partial-span flap, jet boundaries, wing edge discontinuities, etc. See Figure 1. NC is limited to 8.

ML(I) Number of vortex strips in each spanwise section, plus one.

I=1,NC Minimum value for each is 3. Maximum for each ML(I) is 31.

The total number of spanwise strips is limited to 30.

NWING Numerical order of last wing spanwise section.

Group 9 Format 5(6X, I4) 1 card

NJW(I) The numerical order of the flap and jet spans among I=1,NFP the spanwise sections.

Group 10 Format 5(6X, I4) 1 card

NW(1) Number of chordwise vortex elements in each chordwise section.

NW(2) The planform is divided into chordwise sections according

NW(3) to such lines of discontinuity as jet exit, flap hinge, etc.
If there is only one section, SET NW(2) = NW(3) = 0. For 2 sections, SET NW(3) = 0.

ICAM = 1 if the camber ordinates of the airfoils are to be read in. = 0, otherwise. In this case, the camber functions \( \frac{dz}{dx} \) in close-form expressions are to be inserted manually into subprograms ZCR(x) and ZCT(X), the root chord and tip chord camber functions, respectively.

IM Number of camber ordinates to be read in. (Limited to eleven). Arbitrary if ICAM = 0.

Note: Group 11 must be deleted if ICAM = 0.

Group 11. Format 8F10.5 4 or 8 cards

\( \gamma T(1,J), J=1,IM \) Non-dimensional x-coordinates to define root camber.

\( ZC(1,J), J=1,IM \) Non-dimensional camber ordinates of the root chord.

\( XT(2,J), J=1,IM \) Non-dimensional x-coordinates to define tip camber.

\( ZC(2,J), J=1,IM \) Non-dimensional camber ordinates of the tip chord.

Group 12. Format 6F10.5 1 card for each wing section.

\( XXL(1) \) x-coordinate of the leading edge of the inboard boundary chord of a given spanwise section.

\( XXT(1) \) x-coordinate of the trailing edge of the inboard boundary chord of the same spanwise section.

\( YL(1) \) y-coordinate of the inboard boundary chord.

\( XXL(2) \) x-coordinate of the leading edge of the outboard boundary chord of the same spanwise section.
XXT(2)  x-coordinate of the trailing edge of the outboard boundary chord
YL(2)   y-coordinate of the outboard boundary chord.
ZS      z-coordinate of the wing panel relative to the fuselage centerline.

Group 13. Format 6(6X, I4) 1 card

NNJ  Number of jet sections.

Note. The jet region above or on the wing must be divided into streamwise sections by following the divided planform pattern. It is important to start the jet sections always from the wing leading edge even if the jet exit is downstream of the leading edge. The only exception is when the jet exit is at the trailing edge. In this case, NNJ=1 and the jet section starts from the trailing edge.
NNJ is limited to 4. For the configuration of Figure 1, NNJ=4.

NSJ = Number of jet circumferential strips minus one for a non-centered jet (always use odd numbers).
    = Number of jet circumferential strips on the half jet plus one for a centered jet (always use even numbers). See figure 3 of ref. 1.

NCJ(I), No. of streamwise vortex elements in each section. There should be NNJ numbers. For those jet sections above the wing, these numbers should agree with the corresponding numbers of wing vortices. See NW(1). NW(2), NW(3) in Group 10.
Note: Group 14 must be deleted for USB applications

Group 14. Format 6F10.5  NNJ cards

XXL(1)
XXT(1)
YL(1)

XXL(2) Coordinates of bounding chords of the jet section
XXT(2) projected on the x-y plane. For definition, see Group 12.
YL(2)

Note. Group 15 is to be deleted for OWB applications.

Group 15. Format 4F10.5  (4xNNJ) cards.

XXL(I) Coordinates of the bounding lines defining the
XXT(I) rectangular jet sections in USB applications.
YL(I) They are the x-coordinates of the leading and
ZL(I) trailing edges, the y-coordinate and the z-
I=1,..,4 coordinate of the bounding line. The 4 stream-
wise edges of each section are defined in the
order illustrated in figure 2. There are 4
cards for each jet section. The jet section be-
hind the trailing edge, (trailing jet section),
should be at least one local chord in length.

Group 16 Format 2(6X, I4) 1 card

NDG Number of sections in which the dihedral is to be
defined. It does not have to be the same as NC
defined in Group 8. NDG must be at least 1 and limited to 5.

MDG = 1 if the dihedral angle of any section is not zero.
= 0 if no dihedral exists.

Group 17 Format 8F10.5

SNG(1) Dihedral angle in degrees of the first section. Negative for anhedral.
YG(1) the outboard y-coordinate of the first dihedral section.
Repeated NDG times.

Group 18 Format 6(6X, I4) 1 card

KF = 1 if the fuselage is present
= 0, otherwise

NT Number of Fourier components used to satisfy the fuselage surface boundary condition (excluding the zero-order component). Limited to 5. Normally, NT = 2 should provide good results. If NT of more than 2 is to be used, care should be taken as NT*NF is limited to 30 in the present array dimension specifications

NCUM Number of fuselage circumferential locations at which the pressure loading is to be computed. For midwing configurations, use even numbers. Normally, 7 or 8 should be sufficient. Limited to 10.

NF Number of control stations along the fuselage axis at which the fuselage surface boundary condition is to be satisfied.
Normally, 12~14 should be sufficient. Limited to 20.

KW Set to 1 always.

NKF(I) Set to be equal to NF.

Note. If no fuselage is present, all input variables can be zero in Group 18.

Note: The following input data, Groups 19, 20, and 21 must be omitted if no fuselage is present.

Group 19 Format 6F10.5 1 card

XAS(1) x-coordinate of the fuselage nose.
XAS(2) x-coordinate of the fuselage tail.

FUSIND = 0. if the fuselage geometry (i.e., r(x)) is to be defined analytically in subprograms FUR(X) and SLOP(X), where FUR(X) = r(x) and SLOP(X) = r dr/dx.
= 1. if r(x) is to be defined numerically in Groups 20 and 21.

FUSNO = number of fuselage stations to be input to define r(x) if FUSIND = 1. Limited to 21.
= 0., otherwise

X1 Body station in fraction of body length at which the rate of change of cross-sectional area with body length first reaches maximum negative value. See the section under Description of New Program Features.

XJF = 1. if the lower inboard edge of the USB jet is on the fuselage. Note. This situation should be avoided as much as possible.
= 0., otherwise.

**Note.** Groups 20 and 21 should be omitted if FUSIND = 0.

**Group 20** Format 8F10.5

- **XFF(I)** Fuselage x-stations referred to the coordinate origin to define \( r(x) \). Total number of stations is defined by FUSNO.

**Group 21** Format 8F10.5

- **RFF(I)** Fuselage radii corresponding to the x-stations XFF(I).

**Group 22** Format F10.5 (ICASE-1) cards

- **ALP** angles of attack in degrees. These cards are to be included only if additional angles of attack for the same configuration and VMU (NG=0) are to be run.

**Note:** The read statements for the input data in group 3 thru group 21 can be seen in subroutine "GEOMTY" of the program listing along with a short definition of the parameters to be read in. The read statements for groups 1, 2, and 22 along with the corresponding parameter definitions can be seen near the beginning of the program listing in the main routine.
Figure 1 Preparation of the Wing Planform Geometry
Figure 2 Input Coordinates For USB Jet Sections

<table>
<thead>
<tr>
<th>Card</th>
<th>Jet Section</th>
<th>Edge (I)</th>
<th>XXL(I)</th>
<th>XXT(I)</th>
<th>YL(I)</th>
<th>ZL(I)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>1</td>
<td>-1</td>
<td>2</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>1st</td>
<td>2</td>
<td>-1</td>
<td>2</td>
<td>3</td>
<td>.5</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>3</td>
<td>-1</td>
<td>2</td>
<td>6</td>
<td>.5</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>4</td>
<td>-1</td>
<td>2</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>.5</td>
</tr>
<tr>
<td>6</td>
<td>2nd</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>6</td>
<td>.5</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>4</td>
<td>2</td>
<td>3</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>9</td>
<td>3rd</td>
<td>1</td>
<td>3</td>
<td>7</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>2</td>
<td>3</td>
<td>7</td>
<td>3</td>
<td>.5</td>
</tr>
<tr>
<td>11</td>
<td></td>
<td>3</td>
<td>3</td>
<td>7</td>
<td>6</td>
<td>.5</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td>4</td>
<td>3</td>
<td>7</td>
<td>6</td>
<td>0</td>
</tr>
</tbody>
</table>
Pre-Run Check List

Before the program is run, the following checklist should be completed:

(1) The array, GAMMA, defined in the subroutine "SOLUTN", should be dimensioned to have at least \((N+1)^2/4\) elements, where \(N\) is the total number of unknowns (=LTOTAL or LWFJ).

(2) For \(N = 256\), the minimum memory needed is 48K (decimal). For any other \(N\), the required memory can be computed accordingly, based on the change in GAMMA array.

(3) The root and tip camber slope functions should be defined manually in the subprograms ZCR(X), ZCT(X) respectively, otherwise the root and tip camber ordinates should be read in. The camber slope function, \(dz_c/dx\), is defined with respect to a unit chord length. Similarly, the fuselage shape \(r(x)\) and \(r dr/dx\) should be defined manually in the subprograms FUR(X) and SLOP(X), respectively. Otherwise, \(r(x)\) should be read in numerically.

(4) Seven temporary files or tapes must be provided, being designated as (01) through (04) and (07) through (09).

(5) Check input data.
OUTPUT DATA FORMAT

First the title of the job and the input data will be printed in the same format as it was input. If the job is an over-wing blowing configuration the computed jet entrainment will be printed after the fourth line of input data as follows:

- **XJET**: Downstream distance of a given cross-section from the jet exit divided by the jet radius at the exit \((r_0)\).
- **RJET**: The radius of the jet cross section divided by the original jet radius \((r_0)\).
- **DM**: Values printed are actually the nondimensionalized entrainment function \(E(\tilde{x})\) (see equation 33 of reference 3).
- **HALF SW**: The reference half-wing area
- **CREF**: The reference chord
- **LPANEL**: The number of wing vortices
- **JPANEL**: The number of outer (or inner) jet vortices
- **LWFJ**: Total number of unknowns to be solved.

\[
LWFJ = LPANEL + JPANEL*2 + NT*NF
\]

If the job is an OWB configuration a note will be printed at this time indicating the shape of the equivalent jet cross-section used for the interaction computations along with 3 parameters defined below.

1. **x-coordinate** where the equivalent jet properties are evaluated.
2. Equivalent Jet Radius: the radius of the jet at the x location listed above

3. \( \frac{V_0}{V_j} \) the velocity ratio of the equivalent jet.

Vortex Element Endpoint Coordinates

\((X_1, Y_1, Z_1)\) coordinates for the inboard endpoint of a bound vortex element

\((X_2, Y_2, Z_2)\) coordinates for the corresponding outboard endpoint.

Wing elements are listed first and then jet elements. The number of elements listed should equal (LAST).
Control Point Coordinates

2 columns of control point coordinates, one point for each vortex element. Number of points listed should equal LPANEL + JPANEL.

Sectional Pressure and Force Data

<table>
<thead>
<tr>
<th>XV</th>
<th>Percent chord location</th>
</tr>
</thead>
<tbody>
<tr>
<td>YV</td>
<td>Percent half span location</td>
</tr>
<tr>
<td>CP</td>
<td>the total $\Delta C_p$ at the given $(XV, YV)$ point due to both wing-body and jet induced circulation</td>
</tr>
<tr>
<td>CPW</td>
<td>The $\Delta C_p$ that would occur at that same point for the wing-body alone case</td>
</tr>
<tr>
<td>Y/SP</td>
<td>the $y$-coordinate of the chord in question divided by the half-span</td>
</tr>
<tr>
<td>CL</td>
<td>The sectional lift coefficient due to circulation (jet on), nondimensionalized with $q_\infty c$.</td>
</tr>
<tr>
<td>CM</td>
<td>The sectional pitching moment coefficient about the $Y$-axis, nondimensionalized with $q_\infty c^2$.</td>
</tr>
<tr>
<td>CT</td>
<td>The sectional leading edge thrust coefficient, nondimensionalized with $q_\infty c$.</td>
</tr>
<tr>
<td>CDI</td>
<td>The sectional induced drag coefficient, nondimensionalized with $q_\infty c$.</td>
</tr>
<tr>
<td>CLW</td>
<td>The sectional lift coefficient for the wing-body alone case</td>
</tr>
<tr>
<td>CMW</td>
<td>The sectional pitching moment about the $Y$-axis for the wing-body alone case</td>
</tr>
<tr>
<td>CDW</td>
<td>The sectional induced drag coefficient for the wing-body alone case.</td>
</tr>
<tr>
<td>-----</td>
<td>---------------------------------------------------------------------</td>
</tr>
</tbody>
</table>

**Total Force and Moment Data**

<table>
<thead>
<tr>
<th>The lift Coefficient</th>
<th>- The total circulation lift coefficient due to the wing, wing-jet interaction and entrainment (if any). Fuselage lift is not included.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Total Induced Drag Coefficient</th>
<th>Total induced drag coeff. for the jet on case</th>
</tr>
</thead>
</table>

**Induced drag =**

- \( \frac{C_{DL}}{C_L} \) or \( \frac{1}{\text{weAR}} \)

<table>
<thead>
<tr>
<th>Total Pitching Moment Coefficient</th>
<th>= Pitching moment coefficient due to all circulation forces, about the Y-axis. Nondimensionalized with CREF. Fuselage moment is not included.</th>
</tr>
</thead>
</table>

**Note:** In the case of OWB jobs, these coefficients reflect the total jet-on forces and moments, but for USB jobs, the Coanda force and moment coefficients must be added to these; see below.

**USB Jobs**

<table>
<thead>
<tr>
<th>Coanda Lift Coefficient</th>
<th>- The lift coefficient due to the lift component of the jet reaction force</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coanda Drag Coefficient</td>
<td>- Drag coefficient due to the drag component of the jet reaction. Jet thrust is included.</td>
</tr>
<tr>
<td>The Coanda Moment Coeff.</td>
<td>- Pitching moment coefficient due to the pitching moment caused by the jet reaction force (about Y-axis).</td>
</tr>
</tbody>
</table>
O.W.B. Jobs

In the case of O.W.B. jobs the next three coefficients listed have the same definitions as the first three except that the effects of wing-jet interaction have been omitted from the computation.

All Jobs

The next four coefficients printed are due to aerodynamic forces and moments with jet off.

The fuselage lift and pitching moment coefficients are printed next.

If the lateral-directional stability derivatives are to be computed, they will be printed last, both based on the body axes and the stability axes. It should be noted that additional side force at the engine inlet, and therefore additional yawing moment, would occur due to yawed flow conditions, such as in side slip. These effects are not included in the output. For more details, see ref. 4, for example. The $\beta$-derivatives are in per radian.
Example Input and Output

Test Case 1 is for an upper-surface blowing configuration of a wing with zero camber.

Test Case 2 is for the wing-body configuration of ref. 5.

Test Case 3 is for a wing-body configuration of zero camber with over-wing blowing.
### Listing of Input Data Cards for Test Case 1

<table>
<thead>
<tr>
<th>Card</th>
<th>Test Case 1: Wing Only</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1 0 1 1 0 0.028275 0.46827</td>
</tr>
<tr>
<td>2</td>
<td>0.442 0.266 0.22661 0.266 0.</td>
</tr>
<tr>
<td>3</td>
<td>0 1 1 0.8</td>
</tr>
<tr>
<td>4</td>
<td>0 1 1 0.</td>
</tr>
<tr>
<td>5</td>
<td>0.27 0.2324 0.27 0.2324 0.</td>
</tr>
<tr>
<td>6</td>
<td>0.27 0.2324 0.27 0.2324 0.</td>
</tr>
<tr>
<td>7</td>
<td>0.27 0.2324 0.27 0.2324 0.</td>
</tr>
<tr>
<td>8</td>
<td>0.27 0.2324 0.27 0.2324 0.</td>
</tr>
<tr>
<td>9</td>
<td>0.27 0.2324 0.27 0.2324 0.</td>
</tr>
<tr>
<td>10</td>
<td>0.27 0.2324 0.27 0.2324 0.</td>
</tr>
<tr>
<td>11</td>
<td>0.27 0.2324 0.27 0.2324 0.</td>
</tr>
<tr>
<td>12</td>
<td>0.27 0.2324 0.27 0.2324 0.</td>
</tr>
<tr>
<td>13</td>
<td>0.27 0.2324 0.27 0.2324 0.</td>
</tr>
<tr>
<td>14</td>
<td>0.27 0.2324 0.27 0.2324 0.</td>
</tr>
<tr>
<td>15</td>
<td>0.27 0.2324 0.27 0.2324 0.</td>
</tr>
<tr>
<td>16</td>
<td>0.27 0.2324 0.27 0.2324 0.</td>
</tr>
<tr>
<td>17</td>
<td>0.27 0.2324 0.27 0.2324 0.</td>
</tr>
<tr>
<td>18</td>
<td>0.27 0.2324 0.27 0.2324 0.</td>
</tr>
<tr>
<td>19</td>
<td>0.27 0.2324 0.27 0.2324 0.</td>
</tr>
<tr>
<td>20</td>
<td>0.27 0.2324 0.27 0.2324 0.</td>
</tr>
<tr>
<td>21</td>
<td>0.27 0.2324 0.27 0.2324 0.</td>
</tr>
<tr>
<td>22</td>
<td>0.27 0.2324 0.27 0.2324 0.</td>
</tr>
<tr>
<td>23</td>
<td>0.27 0.2324 0.27 0.2324 0.</td>
</tr>
<tr>
<td>24</td>
<td>0.27 0.2324 0.27 0.2324 0.</td>
</tr>
<tr>
<td>25</td>
<td>0.27 0.2324 0.27 0.2324 0.</td>
</tr>
<tr>
<td>26</td>
<td>0.27 0.2324 0.27 0.2324 0.</td>
</tr>
<tr>
<td>27</td>
<td>0.27 0.2324 0.27 0.2324 0.</td>
</tr>
<tr>
<td>28</td>
<td>0.27 0.2324 0.27 0.2324 0.</td>
</tr>
<tr>
<td>29</td>
<td>0.27 0.2324 0.27 0.2324 0.</td>
</tr>
<tr>
<td>30</td>
<td>0.27 0.2324 0.27 0.2324 0.</td>
</tr>
<tr>
<td>31</td>
<td>0 1.2462 0 0 0 0</td>
</tr>
<tr>
<td>32</td>
<td>0 0 0 0 0 0</td>
</tr>
</tbody>
</table>
### Test Case 1, Wing Only

CASE NUMBER = 1

**Input Data**

- **0.00000** 0.00000 1.00000 5.00000 0.02826 0.46827
- 1 1 0.00000
- 0.45500 0.36630 0.00000 3.00000 0.22961 0.26900 0.00000 1.00000
- 0.00000 0.00000 1.00000 0.00000 0.00000 0.00000 0.00000 0.00000
- 1.80000 10.00000 0.00000

- 2 2
- 3 3 4 4

- 3 4 0 0 0
- 1.2700 0.07462 0.00000 0.03405 0.16757 0.16100 0.16100
- 0.03405 0.16757 0.16100 0.09060 0.29222 0.37690 0.16100
- 0.9060 0.29222 0.37690 0.5023 0.81783 1.34620 0.16100
- 0.0762 0.31100 0.00000 0.16757 0.43324 0.16100 0.16100
- 0.16757 0.43324 0.16100 0.29222 0.50330 0.37690 0.16100
- 0.29222 0.50330 0.37690 0.41783 0.81783 1.34620 0.16100

- 3 7 3 4 4

- 3 4 0 0 0
- 0.03405 0.16757 0.16100 0.16100
- 0.03405 0.16757 0.16100 0.22700
- 0.9060 0.29222 0.37690 0.22700
- 0.9060 0.29222 0.37690 0.16100
- 0.43324 0.31100 0.00000 0.16100
- 0.16757 0.43324 0.16100 0.22700
- 0.29222 0.50330 0.37690 0.22700
- 0.29222 0.50330 0.37690 0.16100
- 0.43324 0.90093 0.16100 0.16100
- 0.43324 0.90093 0.16100 0.22700
- 0.50330 0.91600 0.37690 0.22700
- 0.50330 0.91600 0.37690 0.16100

1 1 5.00000 1.34620
0 0 0 0 0 0 0

HALF SW = 0.45500E+00 CREF = 0.36630E+00

LPANEL,JPANEL,LWFJ = 91 88 267

Vortex Element Endpoint Coordinates:

<table>
<thead>
<tr>
<th>X1</th>
<th>X2</th>
<th>Y1</th>
<th>Y2</th>
<th>Z1</th>
<th>Z2</th>
</tr>
</thead>
<tbody>
<tr>
<td>-0.11349</td>
<td>-0.06702</td>
<td>0.00000</td>
<td>0.08050</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>-0.02619</td>
<td>0.02628</td>
<td>0.00000</td>
<td>0.08050</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>.06111</td>
<td>.10759</td>
<td>0.00000</td>
<td>.08050</td>
<td>.16100</td>
<td>.16100</td>
</tr>
<tr>
<td>-.06702</td>
<td>-.02054</td>
<td>.08050</td>
<td>.16100</td>
<td>.16100</td>
<td>.16100</td>
</tr>
<tr>
<td>.02028</td>
<td>.06676</td>
<td>.08050</td>
<td>.16100</td>
<td>.16100</td>
<td>.16100</td>
</tr>
<tr>
<td>.10759</td>
<td>.15406</td>
<td>.08050</td>
<td>.16100</td>
<td>.16100</td>
<td>.16100</td>
</tr>
<tr>
<td>-.02054</td>
<td>.01793</td>
<td>.16100</td>
<td>.22764</td>
<td>.16100</td>
<td>.16100</td>
</tr>
<tr>
<td>.06576</td>
<td>.10523</td>
<td>.16100</td>
<td>.22764</td>
<td>.16100</td>
<td>.16100</td>
</tr>
<tr>
<td>.15406</td>
<td>.19254</td>
<td>.16100</td>
<td>.22764</td>
<td>.16100</td>
<td>.16100</td>
</tr>
<tr>
<td>.01793</td>
<td>.06553</td>
<td>.22764</td>
<td>.31026</td>
<td>.16100</td>
<td>.16100</td>
</tr>
<tr>
<td>.10523</td>
<td>.15294</td>
<td>.22764</td>
<td>.31026</td>
<td>.16100</td>
<td>.16100</td>
</tr>
<tr>
<td>.19254</td>
<td>.24024</td>
<td>.22764</td>
<td>.31026</td>
<td>.16100</td>
<td>.16100</td>
</tr>
<tr>
<td>.06576</td>
<td>.10401</td>
<td>.31026</td>
<td>.37690</td>
<td>.16100</td>
<td>.16100</td>
</tr>
<tr>
<td>.19254</td>
<td>.19241</td>
<td>.31026</td>
<td>.37690</td>
<td>.16100</td>
<td>.16100</td>
</tr>
<tr>
<td>.24024</td>
<td>.27871</td>
<td>.31026</td>
<td>.37690</td>
<td>.16100</td>
<td>.16100</td>
</tr>
<tr>
<td>.10411</td>
<td>.14144</td>
<td>.37690</td>
<td>.44183</td>
<td>.16100</td>
<td>.16100</td>
</tr>
<tr>
<td>.19141</td>
<td>.22776</td>
<td>.37690</td>
<td>.44183</td>
<td>.16100</td>
<td>.16100</td>
</tr>
<tr>
<td>.27871</td>
<td>.31408</td>
<td>.37690</td>
<td>.44183</td>
<td>.16100</td>
<td>.16100</td>
</tr>
<tr>
<td>.14144</td>
<td>.20365</td>
<td>.44183</td>
<td>.55002</td>
<td>.16100</td>
<td>.16100</td>
</tr>
<tr>
<td>.22776</td>
<td>.28833</td>
<td>.44183</td>
<td>.55002</td>
<td>.16100</td>
<td>.16100</td>
</tr>
<tr>
<td>.31408</td>
<td>.37300</td>
<td>.44183</td>
<td>.55002</td>
<td>.16100</td>
<td>.16100</td>
</tr>
<tr>
<td>.20365</td>
<td>.28747</td>
<td>.55002</td>
<td>.69579</td>
<td>.16100</td>
<td>.16100</td>
</tr>
<tr>
<td>.28833</td>
<td>.36993</td>
<td>.55002</td>
<td>.69579</td>
<td>.16100</td>
<td>.16100</td>
</tr>
<tr>
<td>.37300</td>
<td>.45238</td>
<td>.55002</td>
<td>.69579</td>
<td>.16100</td>
<td>.16100</td>
</tr>
<tr>
<td>.28747</td>
<td>.38278</td>
<td>.69579</td>
<td>.86155</td>
<td>.16100</td>
<td>.16100</td>
</tr>
<tr>
<td>.36993</td>
<td>.46272</td>
<td>.69579</td>
<td>.86155</td>
<td>.16100</td>
<td>.16100</td>
</tr>
<tr>
<td>.45238</td>
<td>.54266</td>
<td>.69579</td>
<td>.86155</td>
<td>.16100</td>
<td>.16100</td>
</tr>
<tr>
<td>.38278</td>
<td>.47809</td>
<td>.86155</td>
<td>1.02731</td>
<td>.16100</td>
<td>.16100</td>
</tr>
<tr>
<td>.46272</td>
<td>.55551</td>
<td>.86155</td>
<td>1.02731</td>
<td>.16100</td>
<td>.16100</td>
</tr>
<tr>
<td>.54266</td>
<td>.63293</td>
<td>.86155</td>
<td>1.02731</td>
<td>.16100</td>
<td>.16100</td>
</tr>
<tr>
<td>.47809</td>
<td>.56191</td>
<td>1.02731</td>
<td>1.17308</td>
<td>.16100</td>
<td>.16100</td>
</tr>
<tr>
<td>.55551</td>
<td>.63711</td>
<td>1.02731</td>
<td>1.17308</td>
<td>.16100</td>
<td>.16100</td>
</tr>
<tr>
<td>.63293</td>
<td>.71232</td>
<td>1.02731</td>
<td>1.17308</td>
<td>.16100</td>
<td>.16100</td>
</tr>
<tr>
<td>.56191</td>
<td>.62412</td>
<td>1.17308</td>
<td>1.28127</td>
<td>.16100</td>
<td>.16100</td>
</tr>
<tr>
<td>.63711</td>
<td>.69768</td>
<td>1.17308</td>
<td>1.28127</td>
<td>.16100</td>
<td>.16100</td>
</tr>
<tr>
<td>.71232</td>
<td>.77124</td>
<td>1.17308</td>
<td>1.28127</td>
<td>.16100</td>
<td>.16100</td>
</tr>
<tr>
<td>.62412</td>
<td>.65722</td>
<td>1.28127</td>
<td>1.33884</td>
<td>.16100</td>
<td>.16100</td>
</tr>
<tr>
<td>.69768</td>
<td>.72991</td>
<td>1.28127</td>
<td>1.33884</td>
<td>.16100</td>
<td>.16100</td>
</tr>
<tr>
<td>.71232</td>
<td>.80259</td>
<td>1.28127</td>
<td>1.33884</td>
<td>.16100</td>
<td>.16100</td>
</tr>
<tr>
<td>.08628</td>
<td>.13198</td>
<td>0.00000</td>
<td>.08050</td>
<td>.16100</td>
<td>.16100</td>
</tr>
<tr>
<td>.16919</td>
<td>.20938</td>
<td>0.00000</td>
<td>.08050</td>
<td>.16100</td>
<td>.16100</td>
</tr>
<tr>
<td>.28643</td>
<td>.31884</td>
<td>0.00000</td>
<td>.08050</td>
<td>.16100</td>
<td>.16100</td>
</tr>
<tr>
<td>.36934</td>
<td>.39623</td>
<td>0.00000</td>
<td>.08050</td>
<td>.16100</td>
<td>.16100</td>
</tr>
<tr>
<td>.13198</td>
<td>.17758</td>
<td>.08050</td>
<td>.16100</td>
<td>.16100</td>
<td>.16100</td>
</tr>
<tr>
<td>.20938</td>
<td>.24957</td>
<td>.08050</td>
<td>.16100</td>
<td>.16100</td>
<td>.16100</td>
</tr>
<tr>
<td>.31884</td>
<td>.35124</td>
<td>.08050</td>
<td>.16100</td>
<td>.16100</td>
<td>.16100</td>
</tr>
<tr>
<td>.39623</td>
<td>.42313</td>
<td>.08050</td>
<td>.16100</td>
<td>.16100</td>
<td>.16100</td>
</tr>
<tr>
<td>.17758</td>
<td>.21551</td>
<td>.16100</td>
<td>.22764</td>
<td>.16100</td>
<td>.16100</td>
</tr>
<tr>
<td>.24957</td>
<td>.26284</td>
<td>.16100</td>
<td>.22764</td>
<td>.16100</td>
<td>.16100</td>
</tr>
<tr>
<td>.35124</td>
<td>.37806</td>
<td>.16100</td>
<td>.22764</td>
<td>.16100</td>
<td>.16100</td>
</tr>
<tr>
<td>.42313</td>
<td>.44539</td>
<td>.16100</td>
<td>.22764</td>
<td>.16100</td>
<td>.16100</td>
</tr>
</tbody>
</table>
**CONTROL POINT COORDINATES**

<table>
<thead>
<tr>
<th>XCP</th>
<th>YCP</th>
<th>ZCP</th>
<th>XCP</th>
<th>YCP</th>
<th>ZCP</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0536</td>
<td>0.04025</td>
<td>16.100</td>
<td>0.04743</td>
<td>0.04025</td>
<td>16.100</td>
</tr>
<tr>
<td>0.09786</td>
<td>0.04025</td>
<td>16.100</td>
<td>-0.00683</td>
<td>0.12075</td>
<td>16.100</td>
</tr>
<tr>
<td>0.09393</td>
<td>0.12075</td>
<td>16.100</td>
<td>0.1443</td>
<td>0.12075</td>
<td>16.100</td>
</tr>
<tr>
<td>0.03461</td>
<td>0.19262</td>
<td>16.100</td>
<td>0.13542</td>
<td>0.19262</td>
<td>16.100</td>
</tr>
<tr>
<td>0.18582</td>
<td>0.19262</td>
<td>16.100</td>
<td>0.07868</td>
<td>0.26895</td>
<td>16.100</td>
</tr>
<tr>
<td>0.17949</td>
<td>0.26895</td>
<td>16.100</td>
<td>0.22989</td>
<td>0.26895</td>
<td>16.100</td>
</tr>
<tr>
<td>0.12275</td>
<td>0.34528</td>
<td>16.100</td>
<td>0.22348</td>
<td>0.34528</td>
<td>16.100</td>
</tr>
<tr>
<td>0.27397</td>
<td>0.34528</td>
<td>16.100</td>
<td>0.15762</td>
<td>0.40613</td>
<td>16.100</td>
</tr>
<tr>
<td>0.25792</td>
<td>0.40613</td>
<td>16.100</td>
<td>0.30807</td>
<td>0.40613</td>
<td>16.100</td>
</tr>
<tr>
<td>0.20547</td>
<td>0.40613</td>
<td>16.100</td>
<td>0.30429</td>
<td>0.49029</td>
<td>16.100</td>
</tr>
<tr>
<td>0.35370</td>
<td>0.49029</td>
<td>16.100</td>
<td>0.27879</td>
<td>0.61922</td>
<td>16.100</td>
</tr>
<tr>
<td>0.37534</td>
<td>0.61922</td>
<td>16.100</td>
<td>0.42362</td>
<td>0.61922</td>
<td>16.100</td>
</tr>
<tr>
<td>0.36872</td>
<td>0.77739</td>
<td>16.100</td>
<td>0.4642</td>
<td>0.77739</td>
<td>16.100</td>
</tr>
<tr>
<td>0.50939</td>
<td>0.77739</td>
<td>16.100</td>
<td>0.4642</td>
<td>0.94571</td>
<td>16.100</td>
</tr>
<tr>
<td>0.55525</td>
<td>0.94571</td>
<td>16.100</td>
<td>0.6066</td>
<td>0.94571</td>
<td>16.100</td>
</tr>
</tbody>
</table>

DE POOR QUALITY
<table>
<thead>
<tr>
<th>VORTEX</th>
<th>XV</th>
<th>YV</th>
<th>CP</th>
<th>CPW</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.02713</td>
<td>0.02990</td>
<td>1.82867</td>
<td>1.71493</td>
</tr>
<tr>
<td>2</td>
<td>0.20250</td>
<td>0.02990</td>
<td>1.72016</td>
<td>1.65714</td>
</tr>
<tr>
<td>3</td>
<td>0.37787</td>
<td>0.02990</td>
<td>1.49340</td>
<td>1.43323</td>
</tr>
<tr>
<td>4</td>
<td>0.42769</td>
<td>0.02990</td>
<td>1.43646</td>
<td>1.37755</td>
</tr>
<tr>
<td>5</td>
<td>0.58669</td>
<td>0.02990</td>
<td>1.72016</td>
<td>1.65714</td>
</tr>
<tr>
<td>6</td>
<td>0.81635</td>
<td>0.02990</td>
<td>1.20426</td>
<td>1.19962</td>
</tr>
<tr>
<td>7</td>
<td>0.97735</td>
<td>0.02990</td>
<td>0.9796</td>
<td>0.96716</td>
</tr>
<tr>
<td>8</td>
<td>0.02829</td>
<td>0.08970</td>
<td>1.03029</td>
<td>1.09052</td>
</tr>
<tr>
<td>9</td>
<td>0.21113</td>
<td>0.08970</td>
<td>1.09052</td>
<td>1.06321</td>
</tr>
<tr>
<td>10</td>
<td>0.39598</td>
<td>0.08970</td>
<td>1.09052</td>
<td>1.06321</td>
</tr>
<tr>
<td>11</td>
<td>0.44462</td>
<td>0.08970</td>
<td>1.09052</td>
<td>1.06321</td>
</tr>
<tr>
<td>12</td>
<td>0.60059</td>
<td>0.08970</td>
<td>1.09052</td>
<td>1.06321</td>
</tr>
<tr>
<td>13</td>
<td>0.82163</td>
<td>0.08970</td>
<td>1.09052</td>
<td>1.06321</td>
</tr>
<tr>
<td>14</td>
<td>0.97801</td>
<td>0.08970</td>
<td>1.09052</td>
<td>1.06321</td>
</tr>
<tr>
<td>15</td>
<td>1.02941</td>
<td>0.14308</td>
<td>1.09304</td>
<td>1.09767</td>
</tr>
</tbody>
</table>

**ALPHA = 5.000 DEGREES**
<p>| 16   | 21949 | 14308 | 72271 | 67424 |
| 17   | 40957 | 14308 | 34005 | 42083 |
| 18   | 46033 | 14308 | 103031 | 34900 |
| 19   | 61214 | 14308 | 14684 | 30524 |
| 20   | 82684 | 14308 | 74894 | 18107 |
| 21   | 97865 | 14308 | 58549 | 206422 |
| 22   | 30370 | 19978 | 23486 | 68234 |
| 23   | 22912 | 19978 | 7235 | 11474 |
| 24   | 42754 | 19978 | 33955 | 33739 |
| 25   | 47865 | 19978 | 20752 | 29922 |
| 26   | 62545 | 19978 | 17653 | 17691 |
| 27   | 83278 | 19978 | 83687 | 20410 |
| 28   | 97938 | 19978 | 8410 | 05772 |
| 29   | 30210 | 25649 | 19750 | 210094 |
| 30   | 23963 | 25649 | 34729 | 41466 |
| 31   | 46715 | 25649 | 8231 | 32619 |
| 32   | 49907 | 25649 | 10335 | 29501 |
| 33   | 63999 | 25649 | 72370 | 17674 |
| 34   | 83927 | 25649 | 69778 | 05705 |
| 35   | 98018 | 25649 | 23225 | 12341 |
| 36   | 30315 | 30168 | 75709 | 68777 |
| 37   | 24746 | 30168 | 49725 | 41353 |
| 38   | 46176 | 30168 | 39801 | 31684 |
| 39   | 53144 | 30168 | 6137 | 29272 |
| 40   | 65081 | 30168 | 31250 | 17377 |
| 41   | 84410 | 30168 | 13371 | 05673 |
| 42   | 98078 | 30168 | 32885 | 15159 |
| 43   | 30448 | 36420 | 77401 | 69081 |
| 44   | 25733 | 36420 | 48995 | 41008 |
| 45   | 46018 | 36420 | 37450 | 30837 |
| 46   | 53132 | 36420 | 37020 | 29036 |
| 47   | 66446 | 36420 | 23657 | 17323 |
| 48   | 85019 | 36420 | 9833 | 05685 |
| 49   | 98153 | 36420 | 32861 | 15077 |
| 50   | 30681 | 45998 | 34357 | 16761 |
| 51   | 27476 | 45998 | 75853 | 68688 |
| 52   | 51271 | 45998 | 45320 | 40028 |
| 53   | 56667 | 45998 | 32740 | 28752 |
| 54   | 68656 | 45998 | 32571 | 28348 |
| 55   | 86096 | 45998 | 20066 | 17167 |
| 56   | 98285 | 45998 | 6672 | 05666 |
| 57   | 04034 | 57747 | 29861 | 15077 |
| 58   | 30113 | 57747 | 21235 | 68845 |
| 59   | 56192 | 57747 | 41081 | 37736 |
| 60   | 61740 | 57747 | 27429 | 25154 |
| 61   | 72503 | 57747 | 29162 | 26662 |
| 62   | 87724 | 57747 | 18130 | 16513 |
| 63   | 98466 | 57747 | 6059 | 05902 |
| 64   | 04526 | 70250 | 20105 | 08661 |</p>
<table>
<thead>
<tr>
<th>Y/SP</th>
<th>CL</th>
<th>CM</th>
<th>CT</th>
<th>CDI</th>
<th>CLW</th>
<th>CMW</th>
<th>CDW</th>
</tr>
</thead>
<tbody>
<tr>
<td>.0290</td>
<td>.59220</td>
<td>-.07338</td>
<td>.04034</td>
<td>.04249</td>
<td>.62105</td>
<td>-.09282</td>
<td>.03686</td>
</tr>
<tr>
<td>.0570</td>
<td>.63088</td>
<td>.15618</td>
<td>.05403</td>
<td>.03410</td>
<td>.54683</td>
<td>.10411</td>
<td>.02152</td>
</tr>
<tr>
<td>.1408</td>
<td>.113401</td>
<td>-.85738</td>
<td>.06193</td>
<td>.06984</td>
<td>.56844</td>
<td>.15891</td>
<td>.04231</td>
</tr>
<tr>
<td>.1978</td>
<td>.119648</td>
<td>-.82983</td>
<td>.06942</td>
<td>.09805</td>
<td>.69004</td>
<td>.22333</td>
<td>.02780</td>
</tr>
<tr>
<td>.2564</td>
<td>.111087</td>
<td>-.84433</td>
<td>.07576</td>
<td>.07962</td>
<td>.70982</td>
<td>.29312</td>
<td>.01815</td>
</tr>
<tr>
<td>.30168</td>
<td>.73380</td>
<td>.44346</td>
<td>.08049</td>
<td>.02185</td>
<td>.62471</td>
<td>.35184</td>
<td>.01649</td>
</tr>
<tr>
<td>.36420</td>
<td>.73327</td>
<td>.50984</td>
<td>.08716</td>
<td>.01504</td>
<td>.64387</td>
<td>.23638</td>
<td>.01425</td>
</tr>
<tr>
<td>.45998</td>
<td>.73952</td>
<td>.63551</td>
<td>.09462</td>
<td>.00839</td>
<td>.66970</td>
<td>.57211</td>
<td>.01290</td>
</tr>
<tr>
<td>.57574</td>
<td>.74968</td>
<td>.80354</td>
<td>.10039</td>
<td>.00398</td>
<td>.69569</td>
<td>.74509</td>
<td>.00805</td>
</tr>
<tr>
<td>.70250</td>
<td>.75547</td>
<td>.93261</td>
<td>.10408</td>
<td>.00107</td>
<td>.71333</td>
<td>-.92811</td>
<td>.00691</td>
</tr>
<tr>
<td>.81999</td>
<td>.73914</td>
<td>-.111948</td>
<td>.10363</td>
<td>-.00077</td>
<td>.70601</td>
<td>-.106974</td>
<td>.00243</td>
</tr>
<tr>
<td>.91577</td>
<td>.65436</td>
<td>-.110122</td>
<td>.09265</td>
<td>-.00160</td>
<td>.62932</td>
<td>-.05947</td>
<td>.00081</td>
</tr>
<tr>
<td>.97829</td>
<td>.41195</td>
<td>-.73218</td>
<td>.05928</td>
<td>-.00196</td>
<td>.39751</td>
<td>-.70674</td>
<td>-.00059</td>
</tr>
</tbody>
</table>

The lift coefficient = 0.76694

Total induced drag coefficient = 0.02816

The induced drag parameter = 0.04787
TOTAL PITCHING MOMENT COEFFICIENT = -0.65297
THE COANDA LIFT COEFFICIENT, CLR = 0.46587
THE COANDA DRAG COEFFICIENT, CDR = -1.40297
THE COANDA MOMENT COEFFICIENT, CMR = -0.39958
THE LIFT COEFFICIENT FOR THE WING ALONE = 0.60713
THE INDUCED DRAG COEFFICIENT FOR THE WING ALONE = 0.01435
THE PITCHING MOMENT COEFFICIENT FOR THE WING ALONE = -0.49990
THE INDUCED DRAG PARAMETER FOR THE WING ALONE = 0.03892

LATERAL-DIRECTIONAL STABILITY CHARACTERISTICS WITH JET ON

**STABILITY DERIVATIVES EVALUATED AT ALPHA = 5.000 DEG.
AND AT MACH NO. = 0.000, BASED ON BODY AXES***

 CYB = -0.1602586  CLB = -0.1686574  CNB = 0.0063876
 CYP = 0.3305743  CLP = -0.4357465  CNP = -0.2673868
 CYR = 0.0267657  CLR = 0.1535234  CNR = -0.0067337

**STABILITY DERIVATIVES BASED ON STABILITY AXES***

 CYB = -0.1602586  CLB = -0.1681000  CNB = 0.0211058
 CYP = 0.3329100  CLP = -0.4455930  CNP = -0.2299484
 CYR = -0.0020824  CLR = 0.1909618  CNR = 0.0032027

LATERAL-DIRECTIONAL STABILITY CHARACTERISTICS WITH JET OFF

**STABILITY DERIVATIVES EVALUATED AT ALPHA = 5.000 DEG.
AND AT MACH NO. = 0.000, BASED ON BODY AXES***

 CYB = -0.1346015  CLB = -0.1653598  CNB = 0.0059699
\[\begin{align*}
CYP &= 0.1397994 \quad CLP = -0.4371177 \quad CNP = -0.1398524 \\
CYR &= 0.0201641 \quad CLR = 0.1430642 \quad CNR = -0.0058492 \\
**STABILITY DERIVATIVES BASED ON STABILITY AXES**
CYB &= -0.1346015 \quad CLB = -0.1648388 \quad CNB = 0.0204002 \\
CYP &= 0.1415590 \quad CLP = -0.4368374 \quad CNP = -0.1022171 \\
CYR &= 0.0079643 \quad CLR = 0.1806995 \quad CNR = -0.0061295
\end{align*}\]
<table>
<thead>
<tr>
<th>Card</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>6</td>
</tr>
<tr>
<td>7</td>
</tr>
<tr>
<td>8</td>
</tr>
<tr>
<td>9</td>
</tr>
<tr>
<td>10</td>
</tr>
<tr>
<td>11</td>
</tr>
<tr>
<td>12</td>
</tr>
<tr>
<td>13</td>
</tr>
<tr>
<td>14</td>
</tr>
<tr>
<td>15</td>
</tr>
<tr>
<td>16</td>
</tr>
<tr>
<td>17</td>
</tr>
<tr>
<td>18</td>
</tr>
<tr>
<td>19</td>
</tr>
<tr>
<td>20</td>
</tr>
<tr>
<td>21</td>
</tr>
<tr>
<td>22</td>
</tr>
<tr>
<td>23</td>
</tr>
<tr>
<td>24</td>
</tr>
<tr>
<td>25</td>
</tr>
<tr>
<td>26</td>
</tr>
<tr>
<td>27</td>
</tr>
<tr>
<td>28</td>
</tr>
<tr>
<td>29</td>
</tr>
<tr>
<td>30</td>
</tr>
<tr>
<td>31</td>
</tr>
<tr>
<td>32</td>
</tr>
<tr>
<td>33</td>
</tr>
<tr>
<td>34</td>
</tr>
<tr>
<td>35</td>
</tr>
<tr>
<td>36</td>
</tr>
<tr>
<td>37</td>
</tr>
<tr>
<td>38</td>
</tr>
<tr>
<td>39</td>
</tr>
<tr>
<td>40</td>
</tr>
<tr>
<td>41</td>
</tr>
<tr>
<td>42</td>
</tr>
<tr>
<td>43</td>
</tr>
</tbody>
</table>

Listing of Input Data Cards for Test Case 2

<table>
<thead>
<tr>
<th>Card</th>
<th># NACA TN D-777P</th>
<th>HIGH WING DELTA=44 DEGREES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-0.127 0.07462 0.</td>
<td>-0.127 0.07462 0.161</td>
</tr>
<tr>
<td>2</td>
<td>-0.127 0.07462 0.</td>
<td>-0.127 0.07462 0.161</td>
</tr>
<tr>
<td>3</td>
<td>-0.127 0.07462 0.</td>
<td>-0.127 0.07462 0.161</td>
</tr>
<tr>
<td>4</td>
<td>0.07462 0.20022 0.</td>
<td>0.07462 0.20022 0.161</td>
</tr>
<tr>
<td>5</td>
<td>0.07462 0.20022 0.</td>
<td>0.07462 0.20022 0.161</td>
</tr>
<tr>
<td>6</td>
<td>0.20022 0.30032 0.</td>
<td>0.20022 0.30032 0.161</td>
</tr>
<tr>
<td>7</td>
<td>0.20022 0.30032 0.</td>
<td>0.20022 0.30032 0.161</td>
</tr>
<tr>
<td>8</td>
<td>0.20022 0.30032 0.</td>
<td>0.20022 0.30032 0.161</td>
</tr>
<tr>
<td>9</td>
<td>0.20022 0.30032 0.</td>
<td>0.20022 0.30032 0.161</td>
</tr>
<tr>
<td>10</td>
<td>0.20022 0.30032 0.</td>
<td>0.20022 0.30032 0.161</td>
</tr>
<tr>
<td>11</td>
<td>0.20022 0.30032 0.</td>
<td>0.20022 0.30032 0.161</td>
</tr>
<tr>
<td>12</td>
<td>0.20022 0.30032 0.</td>
<td>0.20022 0.30032 0.161</td>
</tr>
<tr>
<td>13</td>
<td>0.20022 0.30032 0.</td>
<td>0.20022 0.30032 0.161</td>
</tr>
<tr>
<td>14</td>
<td>0.20022 0.30032 0.</td>
<td>0.20022 0.30032 0.161</td>
</tr>
<tr>
<td>15</td>
<td>0.20022 0.30032 0.</td>
<td>0.20022 0.30032 0.161</td>
</tr>
<tr>
<td>16</td>
<td>0.20022 0.30032 0.</td>
<td>0.20022 0.30032 0.161</td>
</tr>
<tr>
<td>17</td>
<td>0.20022 0.30032 0.</td>
<td>0.20022 0.30032 0.161</td>
</tr>
<tr>
<td>18</td>
<td>0.20022 0.30032 0.</td>
<td>0.20022 0.30032 0.161</td>
</tr>
<tr>
<td>19</td>
<td>0.20022 0.30032 0.</td>
<td>0.20022 0.30032 0.161</td>
</tr>
<tr>
<td>20</td>
<td>0.20022 0.30032 0.</td>
<td>0.20022 0.30032 0.161</td>
</tr>
<tr>
<td>21</td>
<td>0.20022 0.30032 0.</td>
<td>0.20022 0.30032 0.161</td>
</tr>
<tr>
<td>22</td>
<td>0.20022 0.30032 0.</td>
<td>0.20022 0.30032 0.161</td>
</tr>
<tr>
<td>23</td>
<td>0.20022 0.30032 0.</td>
<td>0.20022 0.30032 0.161</td>
</tr>
<tr>
<td>24</td>
<td>0.20022 0.30032 0.</td>
<td>0.20022 0.30032 0.161</td>
</tr>
<tr>
<td>25</td>
<td>0.20022 0.30032 0.</td>
<td>0.20022 0.30032 0.161</td>
</tr>
<tr>
<td>26</td>
<td>0.20022 0.30032 0.</td>
<td>0.20022 0.30032 0.161</td>
</tr>
<tr>
<td>27</td>
<td>0.20022 0.30032 0.</td>
<td>0.20022 0.30032 0.161</td>
</tr>
<tr>
<td>28</td>
<td>0.20022 0.30032 0.</td>
<td>0.20022 0.30032 0.161</td>
</tr>
<tr>
<td>29</td>
<td>0.20022 0.30032 0.</td>
<td>0.20022 0.30032 0.161</td>
</tr>
<tr>
<td>30</td>
<td>0.20022 0.30032 0.</td>
<td>0.20022 0.30032 0.161</td>
</tr>
<tr>
<td>31</td>
<td>0.20022 0.30032 0.</td>
<td>0.20022 0.30032 0.161</td>
</tr>
<tr>
<td>32</td>
<td>0.20022 0.30032 0.</td>
<td>0.20022 0.30032 0.161</td>
</tr>
<tr>
<td>33</td>
<td>0.20022 0.30032 0.</td>
<td>0.20022 0.30032 0.161</td>
</tr>
<tr>
<td>34</td>
<td>0.20022 0.30032 0.</td>
<td>0.20022 0.30032 0.161</td>
</tr>
<tr>
<td>35</td>
<td>0.20022 0.30032 0.</td>
<td>0.20022 0.30032 0.161</td>
</tr>
<tr>
<td>36</td>
<td>0.20022 0.30032 0.</td>
<td>0.20022 0.30032 0.161</td>
</tr>
<tr>
<td>37</td>
<td>0.20022 0.30032 0.</td>
<td>0.20022 0.30032 0.161</td>
</tr>
<tr>
<td>38</td>
<td>0.20022 0.30032 0.</td>
<td>0.20022 0.30032 0.161</td>
</tr>
<tr>
<td>39</td>
<td>0.20022 0.30032 0.</td>
<td>0.20022 0.30032 0.161</td>
</tr>
<tr>
<td>40</td>
<td>0.20022 0.30032 0.</td>
<td>0.20022 0.30032 0.161</td>
</tr>
<tr>
<td>41</td>
<td>0.20022 0.30032 0.</td>
<td>0.20022 0.30032 0.161</td>
</tr>
<tr>
<td>42</td>
<td>0.20022 0.30032 0.</td>
<td>0.20022 0.30032 0.161</td>
</tr>
<tr>
<td>43</td>
<td>0.20022 0.30032 0.</td>
<td>0.20022 0.30032 0.161</td>
</tr>
</tbody>
</table>
**Output for Test Case 2**

**Case Number = 1**

<table>
<thead>
<tr>
<th>INPUT DATA</th>
<th>0.00000</th>
<th>0.00000</th>
<th>0.14142</th>
<th>1.00000</th>
<th>5.00000</th>
<th>-1.2700</th>
<th>1.34620</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>1</td>
<td>44.00000</td>
<td>44.00000</td>
<td>0.00000</td>
<td>-1.2700</td>
<td>1.00000</td>
</tr>
<tr>
<td>2</td>
<td>0.45000</td>
<td>0.36630</td>
<td>0.00000</td>
<td>3.00000</td>
<td>0.07462</td>
<td>-0.2700</td>
<td>0.00000</td>
</tr>
<tr>
<td>3</td>
<td>0.13200</td>
<td>44.00000</td>
<td>0.00000</td>
<td>0.00000</td>
<td>0.07462</td>
<td>0.26900</td>
<td>0.00000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CASE NUMBER</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00000</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Notes:**
- Values are approximate and may require rounding or formatting adjustments for publication.
- The table represents input data for a specific case, likely for a computational or experimental test.
<table>
<thead>
<tr>
<th>X1</th>
<th>X2</th>
<th>Y1</th>
<th>Y2</th>
<th>Z1</th>
<th>Z2</th>
</tr>
</thead>
<tbody>
<tr>
<td>-0.11349</td>
<td>-0.11349</td>
<td>0.00000</td>
<td>0.08050</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>-0.06111</td>
<td>-0.06111</td>
<td>0.00000</td>
<td>0.08050</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>-0.11349</td>
<td>-0.11349</td>
<td>-0.08090</td>
<td>0.16100</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>-0.06111</td>
<td>-0.06111</td>
<td>0.08050</td>
<td>0.16100</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>-0.11349</td>
<td>-0.11349</td>
<td>-0.08090</td>
<td>0.16100</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>-0.06111</td>
<td>-0.06111</td>
<td>0.08050</td>
<td>0.16100</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>-0.11349</td>
<td>-0.11349</td>
<td>0.31026</td>
<td>0.45782</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>-0.06111</td>
<td>-0.06111</td>
<td>0.31026</td>
<td>0.45782</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>-0.11349</td>
<td>-0.11349</td>
<td>0.31026</td>
<td>0.45782</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>-0.06111</td>
<td>-0.06111</td>
<td>0.31026</td>
<td>0.45782</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>-0.11349</td>
<td>-0.11349</td>
<td>0.6858</td>
<td>0.76950</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>-0.06111</td>
<td>-0.06111</td>
<td>0.6858</td>
<td>0.76950</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>-0.11349</td>
<td>-0.11349</td>
<td>0.6858</td>
<td>0.76950</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>-0.06111</td>
<td>-0.06111</td>
<td>0.6858</td>
<td>0.76950</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>-0.11349</td>
<td>-0.11349</td>
<td>0.6858</td>
<td>0.76950</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>-0.06111</td>
<td>-0.06111</td>
<td>0.6858</td>
<td>0.76950</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>-0.11349</td>
<td>-0.11349</td>
<td>0.6858</td>
<td>0.76950</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>-0.06111</td>
<td>-0.06111</td>
<td>0.6858</td>
<td>0.76950</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>-0.11349</td>
<td>-0.11349</td>
<td>0.6858</td>
<td>0.76950</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>-0.06111</td>
<td>-0.06111</td>
<td>0.6858</td>
<td>0.76950</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>-0.11349</td>
<td>-0.11349</td>
<td>0.6858</td>
<td>0.76950</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>-0.06111</td>
<td>-0.06111</td>
<td>0.6858</td>
<td>0.76950</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>25908</td>
<td>24495</td>
<td>0.00000</td>
<td>0.08050</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>10378</td>
<td>10128</td>
<td>0.08050</td>
<td>0.16100</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>24455</td>
<td>23003</td>
<td>0.08050</td>
<td>0.16100</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>10128</td>
<td>09922</td>
<td>0.16100</td>
<td>0.22764</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>23003</td>
<td>21800</td>
<td>0.16100</td>
<td>0.22764</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>09922</td>
<td>09666</td>
<td>0.22764</td>
<td>0.31026</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>21600</td>
<td>20309</td>
<td>0.22764</td>
<td>0.31026</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>09666</td>
<td>09460</td>
<td>0.31026</td>
<td>0.37690</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>20309</td>
<td>19106</td>
<td>0.31026</td>
<td>0.37690</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>09460</td>
<td>09209</td>
<td>0.37690</td>
<td>0.45782</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>19106</td>
<td>17646</td>
<td>0.37690</td>
<td>0.45782</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>09209</td>
<td>08852</td>
<td>0.45782</td>
<td>0.57320</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>17646</td>
<td>15563</td>
<td>0.45782</td>
<td>0.57320</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>08852</td>
<td>08495</td>
<td>0.57320</td>
<td>0.68858</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>15563</td>
<td>13480</td>
<td>0.57320</td>
<td>0.68858</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>08495</td>
<td>08244</td>
<td>0.68858</td>
<td>0.76950</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>13480</td>
<td>12020</td>
<td>0.68858</td>
<td>0.76950</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>08244</td>
<td>07382</td>
<td>0.76950</td>
<td>0.88836</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>12020</td>
<td>10379</td>
<td>0.76950</td>
<td>0.88836</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>07382</td>
<td>06152</td>
<td>0.88836</td>
<td>1.05785</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>10379</td>
<td>08040</td>
<td>0.88836</td>
<td>1.05785</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>06152</td>
<td>04922</td>
<td>1.05785</td>
<td>1.22734</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>08040</td>
<td>05701</td>
<td>1.05785</td>
<td>1.22734</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>04922</td>
<td>04162</td>
<td>1.22734</td>
<td>1.33209</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>05701</td>
<td>04255</td>
<td>1.22734</td>
<td>1.33209</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>30395</td>
<td>28644</td>
<td>0.00000</td>
<td>0.08050</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>36778</td>
<td>34791</td>
<td>0.00000</td>
<td>0.08050</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>28644</td>
<td>26893</td>
<td>0.00000</td>
<td>0.16100</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>34791</td>
<td>32805</td>
<td>0.00000</td>
<td>0.16100</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>26893</td>
<td>25444</td>
<td>0.00000</td>
<td>0.22764</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>32805</td>
<td>31160</td>
<td>0.00000</td>
<td>0.22764</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>25444</td>
<td>23647</td>
<td>0.00000</td>
<td>0.22764</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>31160</td>
<td>29121</td>
<td>0.00000</td>
<td>0.31026</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>23647</td>
<td>22197</td>
<td>0.00000</td>
<td>0.31026</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>29121</td>
<td>27477</td>
<td>0.00000</td>
<td>0.37690</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>22197</td>
<td>20437</td>
<td>0.00000</td>
<td>0.37690</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>27477</td>
<td>25479</td>
<td>0.00000</td>
<td>0.45782</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>20437</td>
<td>17927</td>
<td>0.00000</td>
<td>0.45782</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>25479</td>
<td>22632</td>
<td>0.00000</td>
<td>0.45782</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>17927</td>
<td>15417</td>
<td>0.00000</td>
<td>0.45782</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>22632</td>
<td>19784</td>
<td>0.00000</td>
<td>0.45782</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>15417</td>
<td>13657</td>
<td>0.00000</td>
<td>0.45782</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>19784</td>
<td>17787</td>
<td>0.00000</td>
<td>0.45782</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>13657</td>
<td>11679</td>
<td>0.00000</td>
<td>0.45782</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>17787</td>
<td>14958</td>
<td>0.00000</td>
<td>0.45782</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>11679</td>
<td>08859</td>
<td>0.00000</td>
<td>0.45782</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>14958</td>
<td>10923</td>
<td>0.00000</td>
<td>0.45782</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>08859</td>
<td>06038</td>
<td>0.00000</td>
<td>0.45782</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
<tr>
<td>10923</td>
<td>06889</td>
<td>0.00000</td>
<td>0.45782</td>
<td>0.16100</td>
<td>0.16100</td>
</tr>
</tbody>
</table>
CONTROL POINT COORDINATES:

<table>
<thead>
<tr>
<th>XCP</th>
<th>YCP</th>
<th>ZCP</th>
<th>XCP</th>
<th>YCP</th>
<th>ZCP</th>
</tr>
</thead>
<tbody>
<tr>
<td>-0.07660</td>
<td>-0.04025</td>
<td>0.16100</td>
<td>-0.02421</td>
<td>-0.04025</td>
<td>0.16100</td>
</tr>
<tr>
<td>0.07462</td>
<td>-0.04025</td>
<td>0.16100</td>
<td>-0.07660</td>
<td>-0.12075</td>
<td>0.16100</td>
</tr>
<tr>
<td>0.02421</td>
<td>-0.12075</td>
<td>0.16100</td>
<td>0.07462</td>
<td>-0.12075</td>
<td>0.16100</td>
</tr>
<tr>
<td>-0.07660</td>
<td>-0.19262</td>
<td>0.16100</td>
<td>-0.02421</td>
<td>-0.19262</td>
<td>0.16100</td>
</tr>
</tbody>
</table>

**ORIGIN PAGE IS OF POOR QUALITY.**
<table>
<thead>
<tr>
<th>VORTEX</th>
<th>XV</th>
<th>YV</th>
<th>CP</th>
<th>CPW</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.02713</td>
<td>0.02990</td>
<td>6.45517</td>
<td>5.26487</td>
</tr>
<tr>
<td>2</td>
<td>0.20250</td>
<td>0.02990</td>
<td>2.58683</td>
<td>2.03702</td>
</tr>
<tr>
<td>3</td>
<td>0.37787</td>
<td>0.02990</td>
<td>2.1658</td>
<td>-0.01165</td>
</tr>
<tr>
<td>4</td>
<td>0.45607</td>
<td>0.02990</td>
<td>-1.04294</td>
<td>-1.16843</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>.76095</td>
<td>.02990</td>
<td>-2.86361</td>
<td>-2.70494</td>
</tr>
<tr>
<td>6</td>
<td>.84808</td>
<td>.02990</td>
<td>-1.76723</td>
<td>-1.66788</td>
</tr>
<tr>
<td>7</td>
<td>.97394</td>
<td>.02990</td>
<td>-1.69773</td>
<td>-1.67130</td>
</tr>
<tr>
<td>8</td>
<td>.02829</td>
<td>.08970</td>
<td>5.11607</td>
<td>4.30027</td>
</tr>
<tr>
<td>9</td>
<td>.21113</td>
<td>.08970</td>
<td>2.26819</td>
<td>1.87297</td>
</tr>
<tr>
<td>10</td>
<td>.39398</td>
<td>.08970</td>
<td>1.85439</td>
<td>.62040</td>
</tr>
<tr>
<td>11</td>
<td>.48072</td>
<td>.08970</td>
<td>.59620</td>
<td>.29744</td>
</tr>
<tr>
<td>12</td>
<td>.76296</td>
<td>.08970</td>
<td>-4.0015</td>
<td>-6.0151</td>
</tr>
<tr>
<td>13</td>
<td>.84757</td>
<td>.08970</td>
<td>-3.9319</td>
<td>-5.4201</td>
</tr>
<tr>
<td>14</td>
<td>.97385</td>
<td>.08970</td>
<td>-1.7198</td>
<td>-3.1581</td>
</tr>
<tr>
<td>15</td>
<td>.02941</td>
<td>.14308</td>
<td>4.54496</td>
<td>4.09463</td>
</tr>
<tr>
<td>16</td>
<td>.21949</td>
<td>.14308</td>
<td>2.02398</td>
<td>1.79930</td>
</tr>
<tr>
<td>17</td>
<td>.40957</td>
<td>.14308</td>
<td>.78674</td>
<td>.92512</td>
</tr>
<tr>
<td>18</td>
<td>.69440</td>
<td>.14308</td>
<td>8.80496</td>
<td>.95026</td>
</tr>
<tr>
<td>19</td>
<td>.76491</td>
<td>.14308</td>
<td>22.41063</td>
<td>1.41893</td>
</tr>
<tr>
<td>20</td>
<td>.84707</td>
<td>.14308</td>
<td>25.90014</td>
<td>1.22816</td>
</tr>
<tr>
<td>21</td>
<td>.97376</td>
<td>.14308</td>
<td>-3.17332</td>
<td>-1.7137</td>
</tr>
<tr>
<td>22</td>
<td>.03070</td>
<td>.19978</td>
<td>4.45712</td>
<td>4.11760</td>
</tr>
<tr>
<td>23</td>
<td>.22912</td>
<td>.19978</td>
<td>1.95459</td>
<td>1.79600</td>
</tr>
<tr>
<td>24</td>
<td>.42754</td>
<td>.19978</td>
<td>.92968</td>
<td>1.12441</td>
</tr>
<tr>
<td>25</td>
<td>.51124</td>
<td>.19978</td>
<td>7.45508</td>
<td>1.29494</td>
</tr>
<tr>
<td>26</td>
<td>.76715</td>
<td>.19978</td>
<td>31.59883</td>
<td>2.25879</td>
</tr>
<tr>
<td>27</td>
<td>.84649</td>
<td>.19978</td>
<td>30.23895</td>
<td>1.90804</td>
</tr>
<tr>
<td>28</td>
<td>.97366</td>
<td>.19978</td>
<td>2.71523</td>
<td>.49384</td>
</tr>
<tr>
<td>29</td>
<td>.03210</td>
<td>.25649</td>
<td>4.51368</td>
<td>4.18044</td>
</tr>
<tr>
<td>30</td>
<td>.23963</td>
<td>.25649</td>
<td>1.96195</td>
<td>1.81741</td>
</tr>
<tr>
<td>31</td>
<td>.44715</td>
<td>.25649</td>
<td>1.07803</td>
<td>1.24837</td>
</tr>
<tr>
<td>32</td>
<td>.52907</td>
<td>.25649</td>
<td>17.33984</td>
<td>1.44848</td>
</tr>
<tr>
<td>33</td>
<td>.76964</td>
<td>.25649</td>
<td>25.82381</td>
<td>2.55575</td>
</tr>
<tr>
<td>34</td>
<td>.84586</td>
<td>.25649</td>
<td>27.33994</td>
<td>2.17008</td>
</tr>
<tr>
<td>35</td>
<td>.97355</td>
<td>.25649</td>
<td>1.60166</td>
<td>.62556</td>
</tr>
<tr>
<td>36</td>
<td>.03350</td>
<td>.30782</td>
<td>4.60917</td>
<td>4.21241</td>
</tr>
<tr>
<td>37</td>
<td>.25001</td>
<td>.30782</td>
<td>2.01848</td>
<td>1.82692</td>
</tr>
<tr>
<td>38</td>
<td>.46653</td>
<td>.30782</td>
<td>1.45124</td>
<td>1.33375</td>
</tr>
<tr>
<td>39</td>
<td>.54669</td>
<td>.30782</td>
<td>1.68675</td>
<td>1.52888</td>
</tr>
<tr>
<td>40</td>
<td>.77202</td>
<td>.30782</td>
<td>3.13786</td>
<td>2.69362</td>
</tr>
<tr>
<td>41</td>
<td>.84524</td>
<td>.30782</td>
<td>2.64927</td>
<td>2.30851</td>
</tr>
<tr>
<td>42</td>
<td>.97345</td>
<td>.30782</td>
<td>8.99942</td>
<td>6.8278</td>
</tr>
<tr>
<td>43</td>
<td>.03569</td>
<td>.38073</td>
<td>4.65102</td>
<td>1.49547</td>
</tr>
<tr>
<td>44</td>
<td>.26641</td>
<td>.38073</td>
<td>1.99960</td>
<td>1.80659</td>
</tr>
<tr>
<td>45</td>
<td>.49713</td>
<td>.38073</td>
<td>1.57716</td>
<td>1.42301</td>
</tr>
<tr>
<td>46</td>
<td>.49713</td>
<td>.38073</td>
<td>1.74567</td>
<td>1.58101</td>
</tr>
<tr>
<td>47</td>
<td>.75785</td>
<td>.38073</td>
<td>2.96308</td>
<td>2.79088</td>
</tr>
<tr>
<td>48</td>
<td>.84426</td>
<td>.38073</td>
<td>2.57902</td>
<td>2.43865</td>
</tr>
<tr>
<td>49</td>
<td>.97328</td>
<td>.38073</td>
<td>7.98907</td>
<td>1.71982</td>
</tr>
<tr>
<td>50</td>
<td>.03884</td>
<td>.47085</td>
<td>4.42174</td>
<td>4.03568</td>
</tr>
<tr>
<td>51</td>
<td>.28992</td>
<td>.47085</td>
<td>1.84814</td>
<td>1.69152</td>
</tr>
<tr>
<td>52</td>
<td>.54099</td>
<td>.47085</td>
<td>1.56700</td>
<td>1.49320</td>
</tr>
<tr>
<td>53</td>
<td>.61440</td>
<td>.47085</td>
<td>1.63913</td>
<td>1.53371</td>
</tr>
<tr>
<td></td>
<td>Y/SP</td>
<td>CL</td>
<td>CM</td>
<td>CT</td>
</tr>
<tr>
<td>---</td>
<td>------</td>
<td>-------</td>
<td>-------</td>
<td>-------</td>
</tr>
<tr>
<td>54</td>
<td>0.78132</td>
<td>0.47085</td>
<td>2.88119</td>
<td>2.79312</td>
</tr>
<tr>
<td>55</td>
<td>0.84266</td>
<td>0.47085</td>
<td>2.60810</td>
<td>2.53644</td>
</tr>
<tr>
<td>56</td>
<td>0.97304</td>
<td>0.67957</td>
<td>4.10537</td>
<td>3.77962</td>
</tr>
<tr>
<td>57</td>
<td>0.54376</td>
<td>1.16488</td>
<td>1.36102</td>
<td>1.23508</td>
</tr>
<tr>
<td>58</td>
<td>0.54376</td>
<td>2.59415</td>
<td>2.53494</td>
<td>2.59210</td>
</tr>
<tr>
<td>59</td>
<td>0.47085</td>
<td>2.47783</td>
<td>2.53100</td>
<td>2.61400</td>
</tr>
<tr>
<td>60</td>
<td>0.47085</td>
<td>2.81414</td>
<td>3.53124</td>
<td>3.53254</td>
</tr>
<tr>
<td>61</td>
<td>0.67957</td>
<td>2.71192</td>
<td>2.75556</td>
<td>2.75556</td>
</tr>
<tr>
<td>62</td>
<td>0.67957</td>
<td>2.64952</td>
<td>2.66205</td>
<td>2.66205</td>
</tr>
<tr>
<td>63</td>
<td>0.67957</td>
<td>2.58585</td>
<td>2.59210</td>
<td>2.59210</td>
</tr>
<tr>
<td>64</td>
<td>0.67957</td>
<td>2.42160</td>
<td>2.48004</td>
<td>2.48004</td>
</tr>
<tr>
<td>65</td>
<td>0.67957</td>
<td>1.92115</td>
<td>2.12974</td>
<td>2.12974</td>
</tr>
<tr>
<td>66</td>
<td>0.67957</td>
<td>1.71192</td>
<td>1.77845</td>
<td>1.77845</td>
</tr>
<tr>
<td>67</td>
<td>0.67957</td>
<td>1.64952</td>
<td>1.77845</td>
<td>1.77845</td>
</tr>
<tr>
<td>68</td>
<td>0.67957</td>
<td>1.58585</td>
<td>1.77845</td>
<td>1.77845</td>
</tr>
<tr>
<td>69</td>
<td>0.67957</td>
<td>1.51146</td>
<td>1.77845</td>
<td>1.77845</td>
</tr>
<tr>
<td>70</td>
<td>0.67957</td>
<td>1.43712</td>
<td>1.77845</td>
<td>1.77845</td>
</tr>
<tr>
<td>71</td>
<td>0.67957</td>
<td>1.36465</td>
<td>1.77845</td>
<td>1.77845</td>
</tr>
<tr>
<td>72</td>
<td>0.67957</td>
<td>1.29113</td>
<td>1.77845</td>
<td>1.77845</td>
</tr>
<tr>
<td>73</td>
<td>0.67957</td>
<td>1.21781</td>
<td>1.77845</td>
<td>1.77845</td>
</tr>
<tr>
<td>74</td>
<td>0.67957</td>
<td>1.14428</td>
<td>1.77845</td>
<td>1.77845</td>
</tr>
<tr>
<td>75</td>
<td>0.67957</td>
<td>1.07078</td>
<td>1.77845</td>
<td>1.77845</td>
</tr>
<tr>
<td>76</td>
<td>0.67957</td>
<td>0.99723</td>
<td>1.77845</td>
<td>1.77845</td>
</tr>
<tr>
<td>77</td>
<td>0.67957</td>
<td>0.92369</td>
<td>1.77845</td>
<td>1.77845</td>
</tr>
<tr>
<td>78</td>
<td>0.67957</td>
<td>0.85014</td>
<td>1.77845</td>
<td>1.77845</td>
</tr>
<tr>
<td>79</td>
<td>0.67957</td>
<td>0.77660</td>
<td>1.77845</td>
<td>1.77845</td>
</tr>
<tr>
<td>80</td>
<td>0.67957</td>
<td>0.70305</td>
<td>1.77845</td>
<td>1.77845</td>
</tr>
<tr>
<td>81</td>
<td>0.67957</td>
<td>0.62940</td>
<td>1.77845</td>
<td>1.77845</td>
</tr>
<tr>
<td>82</td>
<td>0.67957</td>
<td>0.55576</td>
<td>1.77845</td>
<td>1.77845</td>
</tr>
<tr>
<td>83</td>
<td>0.67957</td>
<td>0.48211</td>
<td>1.77845</td>
<td>1.77845</td>
</tr>
<tr>
<td>84</td>
<td>0.67957</td>
<td>0.40846</td>
<td>1.77845</td>
<td>1.77845</td>
</tr>
<tr>
<td>85</td>
<td>0.67957</td>
<td>0.33481</td>
<td>1.77845</td>
<td>1.77845</td>
</tr>
<tr>
<td>86</td>
<td>0.67957</td>
<td>0.26116</td>
<td>1.77845</td>
<td>1.77845</td>
</tr>
<tr>
<td>87</td>
<td>0.67957</td>
<td>0.18746</td>
<td>1.77845</td>
<td>1.77845</td>
</tr>
<tr>
<td>88</td>
<td>0.67957</td>
<td>0.11376</td>
<td>1.77845</td>
<td>1.77845</td>
</tr>
<tr>
<td>89</td>
<td>0.67957</td>
<td>0.04008</td>
<td>1.77845</td>
<td>1.77845</td>
</tr>
<tr>
<td>90</td>
<td>0.67957</td>
<td>0.96729</td>
<td>1.77845</td>
<td>1.77845</td>
</tr>
<tr>
<td>91</td>
<td>0.67957</td>
<td>0.93190</td>
<td>1.77845</td>
<td>1.77845</td>
</tr>
</tbody>
</table>

---

<table>
<thead>
<tr>
<th></th>
<th>Y/SP</th>
<th>CL</th>
<th>CM</th>
<th>CT</th>
<th>CDI</th>
<th>CLW</th>
<th>CMW</th>
<th>CWDM</th>
</tr>
</thead>
<tbody>
<tr>
<td>92</td>
<td>0.97304</td>
<td>0.78132</td>
<td>0.84266</td>
<td>0.97304</td>
<td>0.78132</td>
<td>0.84266</td>
<td>0.97304</td>
<td>0.78132</td>
</tr>
<tr>
<td>93</td>
<td>1.10815</td>
<td>1.10815</td>
<td>1.08132</td>
<td>1.07078</td>
<td>0.94530</td>
<td>0.94530</td>
<td>0.94530</td>
<td>0.94530</td>
</tr>
<tr>
<td>94</td>
<td>1.08132</td>
<td>1.08132</td>
<td>1.08132</td>
<td>1.08132</td>
<td>1.08132</td>
<td>1.08132</td>
<td>1.08132</td>
<td>1.08132</td>
</tr>
<tr>
<td>95</td>
<td>1.07078</td>
<td>1.07078</td>
<td>1.07078</td>
<td>1.07078</td>
<td>1.07078</td>
<td>1.07078</td>
<td>1.07078</td>
<td>1.07078</td>
</tr>
<tr>
<td>96</td>
<td>1.06010</td>
<td>1.06010</td>
<td>1.06010</td>
<td>1.06010</td>
<td>1.06010</td>
<td>1.06010</td>
<td>1.06010</td>
<td>1.06010</td>
</tr>
<tr>
<td>97</td>
<td>1.05001</td>
<td>1.05001</td>
<td>1.05001</td>
<td>1.05001</td>
<td>1.05001</td>
<td>1.05001</td>
<td>1.05001</td>
<td>1.05001</td>
</tr>
<tr>
<td>98</td>
<td>1.04001</td>
<td>1.04001</td>
<td>1.04001</td>
<td>1.04001</td>
<td>1.04001</td>
<td>1.04001</td>
<td>1.04001</td>
<td>1.04001</td>
</tr>
<tr>
<td>99</td>
<td>1.03001</td>
<td>1.03001</td>
<td>1.03001</td>
<td>1.03001</td>
<td>1.03001</td>
<td>1.03001</td>
<td>1.03001</td>
<td>1.03001</td>
</tr>
<tr>
<td>100</td>
<td>1.02001</td>
<td>1.02001</td>
<td>1.02001</td>
<td>1.02001</td>
<td>1.02001</td>
<td>1.02001</td>
<td>1.02001</td>
<td>1.02001</td>
</tr>
</tbody>
</table>
THE LIFT COEFFICIENT = 3.13778
TOTAL INDUCED DRAG COEFFICIENT = .70047
THE INDUCED DRAG PARAMETER = .07114
TOTAL PITCHING MOMENT COEFFICIENT = -.80898
THE COANDA LIFT COEFFICIENT, CLR = 2.36375
THE COANDA DRAG COEFFICIENT, CDR = -1.51185
THE COANDA MOMENT COEFFICIENT, CMR = -1.38906
THE LIFT COEFFICIENT FOR THE WING ALONE = 1.34306
THE INDUCED DRAG COEFFICIENT FOR THE WING ALONE = .08235
THE PITCHING MOMENT COEFFICIENT FOR THE WING ALONE = .05775
THE INDUCED DRAG PARAMETER FOR THE WING ALONE = .04565

***FUSELAGE AERODYNAMIC CHARACTERISTICS ARE GIVEN BELOW***

***JET-ON CONFIGURATION***

TOTAL PRESSURE LOADING AT EACH X-STATION, BASED ON LOCAL RADIUS

<table>
<thead>
<tr>
<th>X/L</th>
<th>RADIUS</th>
<th>LOADING</th>
</tr>
</thead>
<tbody>
<tr>
<td>-.36964</td>
<td>.02653</td>
<td>.21615</td>
</tr>
<tr>
<td>-.33586</td>
<td>.07697</td>
<td>.67053</td>
</tr>
<tr>
<td>-.27059</td>
<td>.11957</td>
<td>.50266</td>
</tr>
<tr>
<td>-.17830</td>
<td>.14928</td>
<td>.47310</td>
</tr>
<tr>
<td>-.06526</td>
<td>.16099</td>
<td>-.49061</td>
</tr>
<tr>
<td>.06082</td>
<td>.16100</td>
<td>.565183</td>
</tr>
<tr>
<td>.19135</td>
<td>.15954</td>
<td>-.61928</td>
</tr>
<tr>
<td>.31742</td>
<td>.13443</td>
<td>-.39553</td>
</tr>
<tr>
<td>.43046</td>
<td>.10702</td>
<td>-.51522</td>
</tr>
<tr>
<td>.52276</td>
<td>.07778</td>
<td>.32348</td>
</tr>
<tr>
<td>.58802</td>
<td>.04721</td>
<td>-.22526</td>
</tr>
<tr>
<td>.62181</td>
<td>.01583</td>
<td>.44.70392</td>
</tr>
</tbody>
</table>

THE FUSELAGE POTENTIAL LIFT COEFFICIENT = .04924
THE FUSELAGE POTENTIAL MOMENT COEFFICIENT = .05072

***JET-OFF CONFIGURATION***

TOTAL PRESSURE LOADING AT EACH X-STATION, BASED ON LOCAL RADIUS

<table>
<thead>
<tr>
<th>X/L</th>
<th>RADIUS</th>
<th>LOADING</th>
</tr>
</thead>
<tbody>
<tr>
<td>-.36964</td>
<td>.02653</td>
<td>.20605</td>
</tr>
<tr>
<td>-.35586</td>
<td>.07897</td>
<td>.62975</td>
</tr>
<tr>
<td>-.32059</td>
<td>.19357</td>
<td>.49493</td>
</tr>
<tr>
<td>-.17830</td>
<td>.4926</td>
<td>.42110</td>
</tr>
<tr>
<td>-.06526</td>
<td>.16099</td>
<td>-1.27505</td>
</tr>
<tr>
<td>-.06082</td>
<td>.16100</td>
<td>2.56220</td>
</tr>
<tr>
<td>-.19135</td>
<td>.15954</td>
<td>-.5646</td>
</tr>
<tr>
<td>-.31742</td>
<td>.13443</td>
<td>-.45178</td>
</tr>
<tr>
<td>-.43046</td>
<td>.10762</td>
<td>-.57759</td>
</tr>
<tr>
<td>-.52276</td>
<td>.07778</td>
<td>.15781</td>
</tr>
<tr>
<td>-.58802</td>
<td>.04721</td>
<td>-.78707</td>
</tr>
<tr>
<td>-.62181</td>
<td>.01533</td>
<td>39.14723</td>
</tr>
</tbody>
</table>

THE FUSELAGE POTENTIAL LIFT COEFFICIENT = .04958

THE FUSELAGE POTENTIAL MOMENT COEFFICIENT = .06851

LATERAL-DIRECTIONAL STABILITY CHARACTERISTICS WITH JET ON

**STABILITY DERIVATIVES EVALUATED AT ALPHA = 5.000 DEG. AND AT MACH NO. = 0.000, BASED ON BODY AXES***

<table>
<thead>
<tr>
<th>CYB</th>
<th>CLB</th>
<th>CNB</th>
</tr>
</thead>
<tbody>
<tr>
<td>-.9966898</td>
<td>-.1454903</td>
<td>-.0910099</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CYP</th>
<th>CLP</th>
<th>CNP</th>
</tr>
</thead>
<tbody>
<tr>
<td>-.0713625</td>
<td>-.4520820</td>
<td>-.2954078</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CYR</th>
<th>CLR</th>
<th>CNR</th>
</tr>
</thead>
<tbody>
<tr>
<td>-.2470860</td>
<td>-.093970</td>
<td>-.0132019</td>
</tr>
</tbody>
</table>

**STABILITY DERIVATIVES, BASED ON STABILITY AXES***

<table>
<thead>
<tr>
<th>CYB</th>
<th>CLB</th>
<th>CNB</th>
</tr>
</thead>
<tbody>
<tr>
<td>-.9966898</td>
<td>-.1534323</td>
<td>-.3783124</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CYP</th>
<th>CLP</th>
<th>CNP</th>
</tr>
</thead>
<tbody>
<tr>
<td>-.0498001</td>
<td>-.4581427</td>
<td>-.2481083</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CYR</th>
<th>CLR</th>
<th>CNR</th>
</tr>
</thead>
<tbody>
<tr>
<td>-.2533144</td>
<td>-.7477369</td>
<td>-.0064413</td>
</tr>
</tbody>
</table>
LATERAL-DIRECTIONAL STABILITY CHARACTERISTICS WITH JET OFF

**STABILITY DERIVATIVES EVALUATED AT ALPHA = 5.000 DEG. AND AT MACH NO. = 0.000, BASED ON BODY AXES**

<table>
<thead>
<tr>
<th></th>
<th>CYB</th>
<th>CLB</th>
<th>CNB</th>
<th>CYP</th>
<th>CLP</th>
<th>CNP</th>
<th>CYR</th>
<th>CLR</th>
<th>CNR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-.3479661</td>
<td>-.1597114</td>
<td>-.0846101</td>
<td>-.0824657</td>
<td>-.4609142</td>
<td>-.1630398</td>
<td>.0980542</td>
<td>.1661150</td>
<td>-.0044682</td>
</tr>
</tbody>
</table>

**STABILITY DERIVATIVES BASED ON STABILITY AXES**

<table>
<thead>
<tr>
<th></th>
<th>CYB</th>
<th>CLB</th>
<th>CNB</th>
<th>CYP</th>
<th>CLP</th>
<th>CNP</th>
<th>CYR</th>
<th>CLR</th>
<th>CNR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-.3479661</td>
<td>-.1670951</td>
<td>-.0706726</td>
<td>-.0739089</td>
<td>-.4606458</td>
<td>-.1232073</td>
<td>.1052507</td>
<td>.2059474</td>
<td>-.0047366</td>
</tr>
<tr>
<td>Card</td>
<td>S<strong>4</strong>* Test Case 3, Over-Wing Flowing ***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>------</td>
<td>------------------------------------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>0.4 1.003 0.43073 0.85914 2.0 0.01386 3.08396</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>TFFTCAFF 3.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>0.04106 0.85914 0.0 0.0 0.0 0.0 0.0 0.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>0.01386 2.032 0.381 0.254</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>12.9797 2.94 0.0 0.0 -1.299 2.032 0.381 0.254</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>3.6 0.0 0.0 0.0 0.0 0.0 0.0 0.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>3 0.0 0.0 0.0 0.0 0.0 0.0 0.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>3 0.0 0.0 0.0 0.0 0.0 0.0 0.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>2 0.0 0.0 0.0 0.0 0.0 0.0 0.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>-1.5247 2.472 0.741 -0.28884 2.96356 1.778 0.671</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>-0.28884 2.96356 1.778 0.31657 3.20436 2.286 0.671</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>0.31657 3.20436 2.286 2.855 4.214 4.416 0.671</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>3 0.0 0.0 0.0 0.0 0.0 0.0 0.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>-1.299 -0.28884 1.778 -1.299 0.31657 2.286</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>-0.28884 2.96356 1.778 0.31657 3.20436 2.286</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>2.96356 6.21656 1.778 3.20436 6.45676 2.286</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>1 0.0 0.0 0.0 0.0 0.0 0.0 0.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>0.0 4.416</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>1 2 7 17 1 1 1 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>-7.0 9.1 1.0 12.0 1.0 0.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>-7.0 -6.2 -5.4 -4.6 -3.0 -1.4 0.2 1.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>3.4 5.0 6.6 9.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>0.0 0.194 0.761 0.528 0.778 0.917 0.993 1.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>0.944 0.847 0.708 0.444 0.444 0.444 0.444 0.444</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**TEST CASE 3, OVER-WING BLOWING**

---

**CASE NUMBER = 1**

**INPUT DATA**

<table>
<thead>
<tr>
<th>Value</th>
<th>1.00300</th>
<th>.43026</th>
<th>.85914</th>
<th>2.00000</th>
<th>.01386</th>
<th>3.08396</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>0.00000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 12.97970| 2.94000  | 0.00000| 0.00000| -1.29900| 2.03200| .38100   | .25400
| 3.60000| 0.00000  | 0.00000| 0.00000| 0.00000  | 0.00000| 0.00000  |

**THE COMPUTED JET ENTRAINMENT ARE AS FOLLOWS**

<table>
<thead>
<tr>
<th>Value</th>
<th>XJET</th>
<th>RJET</th>
<th>DM/DX</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.76626</td>
<td>2.37532</td>
<td>.03114</td>
<td></td>
</tr>
<tr>
<td>12.01626</td>
<td>2.37532</td>
<td>.03114</td>
<td></td>
</tr>
<tr>
<td>14.51626</td>
<td>2.37905</td>
<td>.03104</td>
<td></td>
</tr>
<tr>
<td>17.01626</td>
<td>2.41896</td>
<td>.03000</td>
<td></td>
</tr>
<tr>
<td>19.51626</td>
<td>2.50324</td>
<td>.02793</td>
<td></td>
</tr>
<tr>
<td>22.01626</td>
<td>2.61298</td>
<td>.02547</td>
<td></td>
</tr>
<tr>
<td>24.01626</td>
<td>2.73386</td>
<td>.02302</td>
<td></td>
</tr>
<tr>
<td>27.01626</td>
<td>2.85818</td>
<td>.02077</td>
<td></td>
</tr>
<tr>
<td>29.51626</td>
<td>2.98203</td>
<td>.01876</td>
<td></td>
</tr>
<tr>
<td>32.01626</td>
<td>3.10350</td>
<td>.01700</td>
<td></td>
</tr>
<tr>
<td>34.51626</td>
<td>3.22167</td>
<td>.01545</td>
<td></td>
</tr>
<tr>
<td>37.01626</td>
<td>3.33617</td>
<td>.01410</td>
<td></td>
</tr>
<tr>
<td>39.51626</td>
<td>3.44692</td>
<td>.01292</td>
<td></td>
</tr>
<tr>
<td>42.01626</td>
<td>3.55396</td>
<td>.01188</td>
<td></td>
</tr>
<tr>
<td>44.51626</td>
<td>3.65744</td>
<td>.01096</td>
<td></td>
</tr>
<tr>
<td>47.01626</td>
<td>3.75791</td>
<td>.01015</td>
<td></td>
</tr>
<tr>
<td>49.51626</td>
<td>3.85436</td>
<td>.00943</td>
<td></td>
</tr>
<tr>
<td>52.01626</td>
<td>3.94818</td>
<td>.00878</td>
<td></td>
</tr>
<tr>
<td>54.51626</td>
<td>4.03915</td>
<td>.00820</td>
<td></td>
</tr>
<tr>
<td>57.01626</td>
<td>4.12742</td>
<td>.00767</td>
<td></td>
</tr>
<tr>
<td>59.51626</td>
<td>4.21317</td>
<td>.00720</td>
<td></td>
</tr>
<tr>
<td>62.01626</td>
<td>4.29654</td>
<td>.00677</td>
<td></td>
</tr>
<tr>
<td>64.51626</td>
<td>4.37767</td>
<td>.00638</td>
<td></td>
</tr>
<tr>
<td>67.01626</td>
<td>4.45669</td>
<td>.00603</td>
<td></td>
</tr>
<tr>
<td>69.51626</td>
<td>4.53372</td>
<td>.00570</td>
<td></td>
</tr>
<tr>
<td>72.01626</td>
<td>4.60866</td>
<td>.00541</td>
<td></td>
</tr>
<tr>
<td>74.51626</td>
<td>4.68222</td>
<td>.00513</td>
<td></td>
</tr>
<tr>
<td>77.01626</td>
<td>4.75355</td>
<td>.00498</td>
<td></td>
</tr>
<tr>
<td>79.51626</td>
<td>4.82394</td>
<td>.00465</td>
<td></td>
</tr>
<tr>
<td>82.01626</td>
<td>4.89216</td>
<td>.00443</td>
<td></td>
</tr>
<tr>
<td>84.51626</td>
<td>4.95926</td>
<td>.00423</td>
<td></td>
</tr>
</tbody>
</table>

---

**OUTPUT FOR TEST CASE 3**
A RECTANGULAR JET WITH LATERAL EXTENT EQUAL TO THE EQUIVALENT JET DIAMETER IS USED FOR INTERACTION COMPUTATION.

NOTE. CHECK WHETHER THE WING IS IMMERSED IN THE JET

THE EQUIVALENT JET PROPERTIES ARE EVALUATED AT 1.54891

THE EQUIVALENT JET RADIUS IS .49329

THE VELOCITY RATIO OF THE EQUIVALENT JET, VO/VJ, IS .66254

VORTEX ELEMENT ENDPOINT COORDINATES:

<table>
<thead>
<tr>
<th>X1</th>
<th>X2</th>
<th>Y1</th>
<th>Y2</th>
<th>Z1</th>
<th>Z2</th>
</tr>
</thead>
<tbody>
<tr>
<td>-1.37258</td>
<td>-1.18113</td>
<td>.74100</td>
<td>.90541</td>
<td>.67100</td>
<td>.67100</td>
</tr>
<tr>
<td>-2.9109</td>
<td>-1.3157</td>
<td>.74100</td>
<td>.90541</td>
<td>.67100</td>
<td>.67100</td>
</tr>
<tr>
<td>1.23839</td>
<td>1.35274</td>
<td>.74100</td>
<td>.90541</td>
<td>.67100</td>
<td>.67100</td>
</tr>
<tr>
<td>2.31988</td>
<td>2.40231</td>
<td>.74100</td>
<td>.90541</td>
<td>.67100</td>
<td>.67100</td>
</tr>
<tr>
<td>-1.18113</td>
<td>-1.90814</td>
<td>.90541</td>
<td>1.13935</td>
<td>.67100</td>
<td>.67100</td>
</tr>
<tr>
<td>-1.3157</td>
<td>0.95899</td>
<td>.90541</td>
<td>1.13935</td>
<td>.67100</td>
<td>.67100</td>
</tr>
<tr>
<td>1.35274</td>
<td>1.51581</td>
<td>.90541</td>
<td>1.13935</td>
<td>.67100</td>
<td>.67100</td>
</tr>
<tr>
<td>2.40231</td>
<td>2.51984</td>
<td>.90541</td>
<td>1.13935</td>
<td>.67100</td>
<td>.67100</td>
</tr>
<tr>
<td>x</td>
<td>y</td>
<td>x</td>
<td>y</td>
<td>x</td>
<td>y</td>
</tr>
<tr>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>-1.17167</td>
<td>-1.17167</td>
<td>2.52529</td>
<td>2.52529</td>
<td>1.44587</td>
<td>.67100</td>
</tr>
<tr>
<td>-.34863</td>
<td>-.34863</td>
<td>2.52529</td>
<td>2.52529</td>
<td>1.44587</td>
<td>.67100</td>
</tr>
<tr>
<td>.47442</td>
<td>.47442</td>
<td>2.52529</td>
<td>2.52529</td>
<td>1.44587</td>
<td>.67100</td>
</tr>
<tr>
<td>-1.25044</td>
<td>-1.21105</td>
<td>1.53871</td>
<td>2.03200</td>
<td>.67100</td>
<td>.67100</td>
</tr>
<tr>
<td>-1.93631</td>
<td>-1.6258</td>
<td>1.53871</td>
<td>2.03200</td>
<td>.67100</td>
<td>.67100</td>
</tr>
<tr>
<td>-2.2258</td>
<td>-1.07408</td>
<td>1.53871</td>
<td>2.03200</td>
<td>.67100</td>
<td>.67100</td>
</tr>
<tr>
<td>0.21105</td>
<td>-1.17167</td>
<td>2.03200</td>
<td>2.52529</td>
<td>.67100</td>
<td>.67100</td>
</tr>
<tr>
<td>-.64577</td>
<td>-.3863</td>
<td>2.03200</td>
<td>2.52529</td>
<td>.67100</td>
<td>.67100</td>
</tr>
<tr>
<td>-.07408</td>
<td>.47442</td>
<td>2.03200</td>
<td>2.52529</td>
<td>.67100</td>
<td>.67100</td>
</tr>
<tr>
<td>1.47442</td>
<td>1.79324</td>
<td>1.53871</td>
<td>2.03200</td>
<td>.67100</td>
<td>.67100</td>
</tr>
<tr>
<td>-.64577</td>
<td>-.3863</td>
<td>2.03200</td>
<td>2.52529</td>
<td>.67100</td>
<td>.67100</td>
</tr>
<tr>
<td>-.44370</td>
<td>-.13071</td>
<td>1.53871</td>
<td>2.03200</td>
<td>1.44587</td>
<td>1.44587</td>
</tr>
<tr>
<td>.48287</td>
<td>.96148</td>
<td>1.53871</td>
<td>2.03200</td>
<td>1.44587</td>
<td>1.44587</td>
</tr>
<tr>
<td>1.79324</td>
<td>2.13635</td>
<td>1.53871</td>
<td>2.03200</td>
<td>1.44587</td>
<td>1.44587</td>
</tr>
<tr>
<td>2.71981</td>
<td>2.96711</td>
<td>1.53871</td>
<td>2.03200</td>
<td>1.44587</td>
<td>1.44587</td>
</tr>
<tr>
<td>1.23635</td>
<td>2.47946</td>
<td>2.03200</td>
<td>2.52529</td>
<td>1.44587</td>
<td>1.44587</td>
</tr>
<tr>
<td>2.96711</td>
<td>3.21442</td>
<td>2.03200</td>
<td>2.52529</td>
<td>1.44587</td>
<td>1.44587</td>
</tr>
<tr>
<td>.70512</td>
<td>.70512</td>
<td>2.52529</td>
<td>2.52529</td>
<td>1.44587</td>
<td>.67100</td>
</tr>
<tr>
<td>1.44008</td>
<td>1.44008</td>
<td>2.52529</td>
<td>2.52529</td>
<td>1.44587</td>
<td>.67100</td>
</tr>
<tr>
<td>2.47946</td>
<td>2.47946</td>
<td>2.52529</td>
<td>2.52529</td>
<td>1.44587</td>
<td>.67100</td>
</tr>
<tr>
<td>3.21442</td>
<td>3.21442</td>
<td>2.52529</td>
<td>2.52529</td>
<td>1.44587</td>
<td>.67100</td>
</tr>
<tr>
<td>-.44370</td>
<td>-.44370</td>
<td>1.53871</td>
<td>2.03200</td>
<td>1.44587</td>
<td>1.44587</td>
</tr>
<tr>
<td>.48287</td>
<td>.96148</td>
<td>1.53871</td>
<td>2.03200</td>
<td>1.44587</td>
<td>1.44587</td>
</tr>
<tr>
<td>1.23635</td>
<td>2.13635</td>
<td>1.53871</td>
<td>2.03200</td>
<td>1.44587</td>
<td>1.44587</td>
</tr>
<tr>
<td>2.71981</td>
<td>2.96711</td>
<td>1.53871</td>
<td>2.03200</td>
<td>1.44587</td>
<td>1.44587</td>
</tr>
<tr>
<td>1.3071</td>
<td>.70512</td>
<td>2.03200</td>
<td>2.52529</td>
<td>1.44587</td>
<td>1.44587</td>
</tr>
<tr>
<td>.96148</td>
<td>1.44008</td>
<td>2.03200</td>
<td>2.52529</td>
<td>1.44587</td>
<td>1.44587</td>
</tr>
<tr>
<td>2.13635</td>
<td>2.47946</td>
<td>2.03200</td>
<td>2.52529</td>
<td>1.44587</td>
<td>1.44587</td>
</tr>
<tr>
<td>2.96711</td>
<td>3.21442</td>
<td>2.03200</td>
<td>2.52529</td>
<td>1.44587</td>
<td>1.44587</td>
</tr>
<tr>
<td>.70512</td>
<td>.70512</td>
<td>2.52529</td>
<td>2.52529</td>
<td>1.44587</td>
<td>.67100</td>
</tr>
<tr>
<td>1.44008</td>
<td>1.44008</td>
<td>2.52529</td>
<td>2.52529</td>
<td>1.44587</td>
<td>.67100</td>
</tr>
<tr>
<td>2.47946</td>
<td>2.47946</td>
<td>2.52529</td>
<td>2.52529</td>
<td>1.44587</td>
<td>.67100</td>
</tr>
<tr>
<td>3.21442</td>
<td>3.21442</td>
<td>2.52529</td>
<td>2.52529</td>
<td>1.44587</td>
<td>.67100</td>
</tr>
<tr>
<td>-.44370</td>
<td>-.44370</td>
<td>1.53871</td>
<td>2.03200</td>
<td>1.44587</td>
<td>1.44587</td>
</tr>
<tr>
<td>.48287</td>
<td>.96148</td>
<td>1.53871</td>
<td>2.03200</td>
<td>1.44587</td>
<td>1.44587</td>
</tr>
<tr>
<td>1.23635</td>
<td>2.13635</td>
<td>1.53871</td>
<td>2.03200</td>
<td>1.44587</td>
<td>1.44587</td>
</tr>
<tr>
<td>2.71981</td>
<td>2.96711</td>
<td>1.53871</td>
<td>2.03200</td>
<td>1.44587</td>
<td>1.44587</td>
</tr>
<tr>
<td>1.3071</td>
<td>.70512</td>
<td>2.03200</td>
<td>2.52529</td>
<td>1.44587</td>
<td>1.44587</td>
</tr>
<tr>
<td>.96148</td>
<td>1.44008</td>
<td>2.03200</td>
<td>2.52529</td>
<td>1.44587</td>
<td>1.44587</td>
</tr>
<tr>
<td>2.13635</td>
<td>2.47946</td>
<td>2.03200</td>
<td>2.52529</td>
<td>1.44587</td>
<td>1.44587</td>
</tr>
<tr>
<td>2.96711</td>
<td>3.21442</td>
<td>2.03200</td>
<td>2.52529</td>
<td>1.44587</td>
<td>1.44587</td>
</tr>
<tr>
<td>.70512</td>
<td>.70512</td>
<td>2.52529</td>
<td>2.52529</td>
<td>1.44587</td>
<td>.67100</td>
</tr>
<tr>
<td>1.44008</td>
<td>1.44008</td>
<td>2.52529</td>
<td>2.52529</td>
<td>1.44587</td>
<td>.67100</td>
</tr>
<tr>
<td>2.47946</td>
<td>2.47946</td>
<td>2.52529</td>
<td>2.52529</td>
<td>1.44587</td>
<td>.67100</td>
</tr>
<tr>
<td>3.21442</td>
<td>3.21442</td>
<td>2.52529</td>
<td>2.52529</td>
<td>1.44587</td>
<td>.67100</td>
</tr>
<tr>
<td>-.44370</td>
<td>-.44370</td>
<td>1.53871</td>
<td>2.03200</td>
<td>1.44587</td>
<td>1.44587</td>
</tr>
<tr>
<td>.48287</td>
<td>.96148</td>
<td>1.53871</td>
<td>2.03200</td>
<td>1.44587</td>
<td>1.44587</td>
</tr>
<tr>
<td>1.23635</td>
<td>2.13635</td>
<td>1.53871</td>
<td>2.03200</td>
<td>1.44587</td>
<td>1.44587</td>
</tr>
<tr>
<td>2.71981</td>
<td>2.96711</td>
<td>1.53871</td>
<td>2.03200</td>
<td>1.44587</td>
<td>1.44587</td>
</tr>
<tr>
<td>1.3071</td>
<td>.70512</td>
<td>2.03200</td>
<td>2.52529</td>
<td>1.44587</td>
<td>1.44587</td>
</tr>
<tr>
<td>.96148</td>
<td>1.44008</td>
<td>2.03200</td>
<td>2.52529</td>
<td>1.44587</td>
<td>1.44587</td>
</tr>
<tr>
<td>2.13635</td>
<td>2.47946</td>
<td>2.03200</td>
<td>2.52529</td>
<td>1.44587</td>
<td>1.44587</td>
</tr>
<tr>
<td>2.96711</td>
<td>3.21442</td>
<td>2.03200</td>
<td>2.52529</td>
<td>1.44587</td>
<td>1.44587</td>
</tr>
<tr>
<td>XCP</td>
<td>YCP</td>
<td>ZCP</td>
<td>XCP</td>
<td>YCP</td>
<td>ZCP</td>
</tr>
<tr>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td>3.98813</td>
<td>3.98813</td>
<td>2.52529</td>
<td>2.52529</td>
<td>1.44587</td>
<td>.67100</td>
</tr>
<tr>
<td>4.94399</td>
<td>4.94399</td>
<td>2.52529</td>
<td>2.52529</td>
<td>1.44587</td>
<td>.67100</td>
</tr>
<tr>
<td>5.89985</td>
<td>5.89985</td>
<td>2.52529</td>
<td>2.52529</td>
<td>1.44587</td>
<td>.67100</td>
</tr>
<tr>
<td>6.49060</td>
<td>6.49060</td>
<td>2.52529</td>
<td>2.52529</td>
<td>1.44587</td>
<td>.67100</td>
</tr>
<tr>
<td>2.92972</td>
<td>3.16355</td>
<td>1.53871</td>
<td>2.03200</td>
<td>.67100</td>
<td>.67100</td>
</tr>
<tr>
<td>3.52047</td>
<td>3.75430</td>
<td>1.53871</td>
<td>2.03200</td>
<td>.67100</td>
<td>.67100</td>
</tr>
<tr>
<td>4.47633</td>
<td>4.71016</td>
<td>1.53871</td>
<td>2.03200</td>
<td>.67100</td>
<td>.67100</td>
</tr>
<tr>
<td>5.43219</td>
<td>5.66002</td>
<td>1.53871</td>
<td>2.03200</td>
<td>.67100</td>
<td>.67100</td>
</tr>
<tr>
<td>6.02294</td>
<td>6.25677</td>
<td>1.53871</td>
<td>2.03200</td>
<td>.67100</td>
<td>.67100</td>
</tr>
<tr>
<td>3.16355</td>
<td>3.39738</td>
<td>2.03200</td>
<td>2.52529</td>
<td>.67100</td>
<td>.67100</td>
</tr>
<tr>
<td>3.75430</td>
<td>3.98813</td>
<td>2.03200</td>
<td>2.52529</td>
<td>.67100</td>
<td>.67100</td>
</tr>
<tr>
<td>4.71016</td>
<td>4.94399</td>
<td>2.03200</td>
<td>2.52529</td>
<td>.67100</td>
<td>.67100</td>
</tr>
<tr>
<td>5.86602</td>
<td>5.89985</td>
<td>2.03200</td>
<td>2.52529</td>
<td>.67100</td>
<td>.67100</td>
</tr>
<tr>
<td>6.25677</td>
<td>6.49060</td>
<td>2.03200</td>
<td>2.52529</td>
<td>.67100</td>
<td>.67100</td>
</tr>
</tbody>
</table>

CONTROL POINT COORDINATES:

XCP | YCP | ZCP | XCP | YCP | ZCP |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>-1.85662</td>
<td>.81717</td>
<td>.67100</td>
<td>.53709</td>
<td>.81717</td>
<td>.67100</td>
</tr>
<tr>
<td>1.93081</td>
<td>.81717</td>
<td>.67100</td>
<td>2.50811</td>
<td>.81717</td>
<td>.67100</td>
</tr>
<tr>
<td>-6.3991</td>
<td>1.01660</td>
<td>.67100</td>
<td>1.01660</td>
<td>1.01660</td>
<td>.67100</td>
</tr>
<tr>
<td>2.04631</td>
<td>1.01660</td>
<td>.67100</td>
<td>2.50811</td>
<td>.81717</td>
<td>.67100</td>
</tr>
<tr>
<td>-1.37205</td>
<td>1.26310</td>
<td>.67100</td>
<td>1.26310</td>
<td>.67100</td>
<td>.67100</td>
</tr>
<tr>
<td>2.18906</td>
<td>1.26310</td>
<td>.67100</td>
<td>2.71949</td>
<td>1.26310</td>
<td>.67100</td>
</tr>
<tr>
<td>-1.5584</td>
<td>1.46253</td>
<td>.67100</td>
<td>1.46253</td>
<td>.67100</td>
<td>.67100</td>
</tr>
<tr>
<td>2.30456</td>
<td>1.46253</td>
<td>.67100</td>
<td>2.81402</td>
<td>1.46253</td>
<td>.67100</td>
</tr>
<tr>
<td>.19545</td>
<td>1.78535</td>
<td>.67100</td>
<td>1.34348</td>
<td>1.78535</td>
<td>.67100</td>
</tr>
<tr>
<td>2.49151</td>
<td>1.78535</td>
<td>.67100</td>
<td>2.95704</td>
<td>1.78535</td>
<td>.67100</td>
</tr>
<tr>
<td>.73149</td>
<td>2.7865</td>
<td>.67100</td>
<td>1.75434</td>
<td>2.7865</td>
<td>.67100</td>
</tr>
<tr>
<td>2.77719</td>
<td>2.7865</td>
<td>.67100</td>
<td>3.20087</td>
<td>2.7865</td>
<td>.67100</td>
</tr>
<tr>
<td>1.10124</td>
<td>2.18906</td>
<td>.67100</td>
<td>2.03774</td>
<td>2.18906</td>
<td>.67100</td>
</tr>
<tr>
<td>2.97425</td>
<td>2.18906</td>
<td>.67100</td>
<td>3.36217</td>
<td>2.18906</td>
<td>.67100</td>
</tr>
<tr>
<td>1.38628</td>
<td>2.88123</td>
<td>.67100</td>
<td>2.25629</td>
<td>2.88123</td>
<td>.67100</td>
</tr>
<tr>
<td>3.12616</td>
<td>2.88123</td>
<td>.67100</td>
<td>3.40851</td>
<td>2.88123</td>
<td>.67100</td>
</tr>
<tr>
<td>1.79818</td>
<td>3.26029</td>
<td>.67100</td>
<td>2.57193</td>
<td>3.26029</td>
<td>.67100</td>
</tr>
<tr>
<td>3.34568</td>
<td>3.26029</td>
<td>.67100</td>
<td>3.66618</td>
<td>3.26029</td>
<td>.67100</td>
</tr>
<tr>
<td>2.25535</td>
<td>3.68101</td>
<td>.67100</td>
<td>2.92234</td>
<td>3.68101</td>
<td>.67100</td>
</tr>
<tr>
<td>3.50933</td>
<td>3.68101</td>
<td>.67100</td>
<td>3.86561</td>
<td>3.68101</td>
<td>.67100</td>
</tr>
<tr>
<td>2.60725</td>
<td>4.36007</td>
<td>.67100</td>
<td>3.02305</td>
<td>4.36007</td>
<td>.67100</td>
</tr>
<tr>
<td>3.80865</td>
<td>4.06007</td>
<td>.67100</td>
<td>4.04528</td>
<td>4.06007</td>
<td>.67100</td>
</tr>
<tr>
<td>2.95229</td>
<td>4.32238</td>
<td>.67100</td>
<td>3.48565</td>
<td>4.32238</td>
<td>.67100</td>
</tr>
<tr>
<td>3.96076</td>
<td>4.32238</td>
<td>.67100</td>
<td>4.16962</td>
<td>4.32238</td>
<td>.67100</td>
</tr>
<tr>
<td>-1.11775</td>
<td>1.53871</td>
<td>1.05843</td>
<td>-1.75526</td>
<td>1.53871</td>
<td>1.05843</td>
</tr>
<tr>
<td>-1.37402</td>
<td>1.53871</td>
<td>1.05843</td>
<td>-1.04427</td>
<td>1.78535</td>
<td>1.44587</td>
</tr>
<tr>
<td>-1.38481</td>
<td>1.78535</td>
<td>1.44587</td>
<td>-2.8008</td>
<td>1.78535</td>
<td>1.44587</td>
</tr>
<tr>
<td>-1.89730</td>
<td>2.2785</td>
<td>1.44587</td>
<td>-0.9389</td>
<td>2.2785</td>
<td>1.44587</td>
</tr>
<tr>
<td>.30781</td>
<td>2.2785</td>
<td>1.44587</td>
<td>-0.8234</td>
<td>2.2785</td>
<td>1.44587</td>
</tr>
<tr>
<td>.12656</td>
<td>2.52529</td>
<td>1.05843</td>
<td>1.05843</td>
<td>.67100</td>
<td></td>
</tr>
<tr>
<td>-1.04427</td>
<td>1.78535</td>
<td>1.05843</td>
<td>1.05843</td>
<td>.67100</td>
<td></td>
</tr>
<tr>
<td>VORTEX</td>
<td>XV</td>
<td>YV</td>
<td>CP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------</td>
<td>--------</td>
<td>--------</td>
<td>---------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>0.3865</td>
<td>1.8505</td>
<td>3.9232</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>0.3086</td>
<td>1.8505</td>
<td>1.0702</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>0.6913</td>
<td>1.8505</td>
<td>0.0294</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>0.9819</td>
<td>1.8505</td>
<td>0.0583</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>0.3865</td>
<td>2.3021</td>
<td>4.0380</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>0.3086</td>
<td>2.3021</td>
<td>1.1075</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>0.6913</td>
<td>2.3021</td>
<td>0.0244</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>0.9619</td>
<td>2.3021</td>
<td>0.0004</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>0.3865</td>
<td>2.8603</td>
<td>4.3208</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>0.3086</td>
<td>2.8603</td>
<td>1.1031</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>0.6913</td>
<td>2.8603</td>
<td>0.0299</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>0.9619</td>
<td>2.8603</td>
<td>0.01210</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**ORIGINAL PAGE 39**

**OF 48 PAGES**
<p>| | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>.03806</td>
<td>.33119</td>
<td>.45889</td>
<td>.37454</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>.30866</td>
<td>.33119</td>
<td>.10907</td>
<td>.09296</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>.96194</td>
<td>.33119</td>
<td>.03549</td>
<td>.02769</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>.03806</td>
<td>.03413</td>
<td>.03413</td>
<td>.00425</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>.30866</td>
<td>.58478</td>
<td>.28462</td>
<td>.23472</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>.96194</td>
<td>.13474</td>
<td>.10114</td>
<td>.06516</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>.03806</td>
<td>.12117</td>
<td>.09777</td>
<td>.03352</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>.30866</td>
<td>.54643</td>
<td>.39921</td>
<td>.11052</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>.96194</td>
<td>.14793</td>
<td>.11052</td>
<td>.04075</td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>.03806</td>
<td>.06907</td>
<td>.01061</td>
<td>.02480</td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>.30866</td>
<td>.73908</td>
<td>.21432</td>
<td>.01164</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>.96194</td>
<td>.14156</td>
<td>.11578</td>
<td>.04378</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>.03806</td>
<td>.07043</td>
<td>.04378</td>
<td>.01148</td>
<td></td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>.30866</td>
<td>.05318</td>
<td>.04378</td>
<td>.04216</td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>.96194</td>
<td>.49667</td>
<td>.11052</td>
<td>.11829</td>
<td></td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>.03806</td>
<td>.14665</td>
<td>.04500</td>
<td>.00823</td>
<td></td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>.30866</td>
<td>.06809</td>
<td>.00823</td>
<td>.01164</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>.96194</td>
<td>.02611</td>
<td>.01164</td>
<td>.01164</td>
<td></td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>.03806</td>
<td>.1639</td>
<td>.01164</td>
<td>.01164</td>
<td></td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>.30866</td>
<td>.01639</td>
<td>.01164</td>
<td>.01164</td>
<td></td>
<td></td>
</tr>
<tr>
<td>33</td>
<td>.96194</td>
<td>.50752</td>
<td>.01164</td>
<td>.01164</td>
<td></td>
<td></td>
</tr>
<tr>
<td>34</td>
<td>.03806</td>
<td>.13710</td>
<td>.01164</td>
<td>.01164</td>
<td></td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>.30866</td>
<td>.04659</td>
<td>.01164</td>
<td>.01164</td>
<td></td>
<td></td>
</tr>
<tr>
<td>36</td>
<td>.96194</td>
<td>.11629</td>
<td>.01164</td>
<td>.01164</td>
<td></td>
<td></td>
</tr>
<tr>
<td>37</td>
<td>.03806</td>
<td>.03646</td>
<td>.01164</td>
<td>.01164</td>
<td></td>
<td></td>
</tr>
<tr>
<td>38</td>
<td>.30866</td>
<td>.00823</td>
<td>.01164</td>
<td>.01164</td>
<td></td>
<td></td>
</tr>
<tr>
<td>39</td>
<td>.96194</td>
<td>.00823</td>
<td>.01164</td>
<td>.01164</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>.03806</td>
<td>.12443</td>
<td>.01164</td>
<td>.01164</td>
<td></td>
<td></td>
</tr>
<tr>
<td>41</td>
<td>.30866</td>
<td>.06373</td>
<td>.01164</td>
<td>.01164</td>
<td></td>
<td></td>
</tr>
<tr>
<td>42</td>
<td>.96194</td>
<td>.36375</td>
<td>.01164</td>
<td>.01164</td>
<td></td>
<td></td>
</tr>
<tr>
<td>43</td>
<td>.03806</td>
<td>.36375</td>
<td>.01164</td>
<td>.01164</td>
<td></td>
<td></td>
</tr>
<tr>
<td>44</td>
<td>.30866</td>
<td>.36375</td>
<td>.01164</td>
<td>.01164</td>
<td></td>
<td></td>
</tr>
<tr>
<td>45</td>
<td>.96194</td>
<td>.36375</td>
<td>.01164</td>
<td>.01164</td>
<td></td>
<td></td>
</tr>
<tr>
<td>46</td>
<td>.03806</td>
<td>.36375</td>
<td>.01164</td>
<td>.01164</td>
<td></td>
<td></td>
</tr>
<tr>
<td>47</td>
<td>.30866</td>
<td>.36375</td>
<td>.01164</td>
<td>.01164</td>
<td></td>
<td></td>
</tr>
<tr>
<td>48</td>
<td>.96194</td>
<td>.36375</td>
<td>.01164</td>
<td>.01164</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Y/SP</th>
<th>CL</th>
<th>CM</th>
<th>CT</th>
<th>CDI</th>
<th>CLW</th>
<th>CMW</th>
<th>CDW</th>
</tr>
</thead>
<tbody>
<tr>
<td>.18505</td>
<td>.10449</td>
<td>.02596</td>
<td>.00148</td>
<td>.00217</td>
<td>.08856</td>
<td>.02453</td>
<td>.00176</td>
</tr>
<tr>
<td>.23021</td>
<td>.10988</td>
<td>.01764</td>
<td>.00333</td>
<td>.00001</td>
<td>.09285</td>
<td>.01716</td>
<td>-.00005</td>
</tr>
<tr>
<td>.26603</td>
<td>.11773</td>
<td>.00643</td>
<td>.00430</td>
<td>-.00019</td>
<td>.09788</td>
<td>.00739</td>
<td>.00003</td>
</tr>
<tr>
<td>.33119</td>
<td>.12668</td>
<td>-.00532</td>
<td>.00603</td>
<td>-.00161</td>
<td>.10158</td>
<td>-.00114</td>
<td>.00011</td>
</tr>
<tr>
<td>.40429</td>
<td>.17320</td>
<td>-.00712</td>
<td>.00243</td>
<td>.00036</td>
<td>.10788</td>
<td>-.01518</td>
<td>.00025</td>
</tr>
<tr>
<td>.51600</td>
<td>.18223</td>
<td>-.00750</td>
<td>.00249</td>
<td>.00037</td>
<td>.11653</td>
<td>-.03816</td>
<td>.00032</td>
</tr>
<tr>
<td>.59305</td>
<td>.16032</td>
<td>-.00853</td>
<td>.00613</td>
<td>-.00003</td>
<td>.12195</td>
<td>-.05474</td>
<td>.00020</td>
</tr>
<tr>
<td>.65245</td>
<td>.15585</td>
<td>-.00768</td>
<td>.00569</td>
<td>-.00025</td>
<td>.12443</td>
<td>-.06731</td>
<td>.00018</td>
</tr>
<tr>
<td>.73829</td>
<td>.12505</td>
<td>-.10386</td>
<td>.00580</td>
<td>-.00047</td>
<td>.12660</td>
<td>-.08482</td>
<td>.00004</td>
</tr>
<tr>
<td>.83356</td>
<td>.14471</td>
<td>-.11750</td>
<td>.00596</td>
<td>-.00091</td>
<td>.12319</td>
<td>-.09953</td>
<td>.00493</td>
</tr>
<tr>
<td>.91940</td>
<td>.12160</td>
<td>-.11239</td>
<td>.00573</td>
<td>-.00149</td>
<td>.10534</td>
<td>-.09720</td>
<td>.00403</td>
</tr>
</tbody>
</table>
THE LIFT COEFFICIENT = .10438
TOTAL INDUCED DRAG COEFFICIENT = .00060
THE INDUCED DRAG PARAMETER = .05465
TOTAL PITCHING MOMENT COEFFICIENT = -.03792
THE LIFT COEFFICIENT WITH JET ENTRAINMENT ALONG = .08615
THE INDUCED DRAG COEFFICIENT WITH JET ENTRAINMENT ALONE = -.00006
THE PITCHING MOMENT COEFFICIENT WITH JET ENTRAINMENT ALONE = -.02854
THE LIFT COEFFICIENT FOR THE WING ALONE = .07592
THE INDUCED DRAG COEFFICIENT FOR THE WING ALONE = .00065
THE PITCHING MOMENT COEFFICIENT FOR THE WING ALONE = -.02624
THE INDUCED DRAG PARAMETER FOR THE WING ALONE = .10407

***FUSELAGE AERODYNAMIC CHARACTERISTICS ARE GIVEN BELOW***

***JET-ON CONFIGURATION***

TOTAL PRESSURE LOADING AT EACH X-STATION, BASED ON LOCAL RADIUS

<table>
<thead>
<tr>
<th>X/L</th>
<th>RADIUS</th>
<th>LOADING</th>
</tr>
</thead>
<tbody>
<tr>
<td>-.43322</td>
<td>.01871</td>
<td>.05259</td>
</tr>
<tr>
<td>-.39944</td>
<td>.15172</td>
<td>.08151</td>
</tr>
<tr>
<td>-.34318</td>
<td>.37217</td>
<td>.08391</td>
</tr>
<tr>
<td>-.24188</td>
<td>.65812</td>
<td>.04907</td>
</tr>
<tr>
<td>-.12884</td>
<td>.86934</td>
<td>.01899</td>
</tr>
<tr>
<td>-.00276</td>
<td>.98553</td>
<td>.01521</td>
</tr>
<tr>
<td>.12776</td>
<td>.99496</td>
<td>.03406</td>
</tr>
<tr>
<td>.25384</td>
<td>.89868</td>
<td>.00060</td>
</tr>
<tr>
<td>.36688</td>
<td>.77627</td>
<td>-.01669</td>
</tr>
<tr>
<td>.45918</td>
<td>.63125</td>
<td>.01137</td>
</tr>
<tr>
<td>.52444</td>
<td>.51895</td>
<td>-.02437</td>
</tr>
<tr>
<td>.58222</td>
<td>.45209</td>
<td>-.09439</td>
</tr>
</tbody>
</table>

THE FUSELAGE POTENTIAL LIFT COEFFICIENT = .00900
THE FUSELAGE POTENTIAL MOMENT COEFFICIENT = .00829
***JET-OFF CONFIGURATION***

TOTAL PRESSURE LOADING AT EACH X-STATI0N, BASED ON LOCAL RADIUS

<table>
<thead>
<tr>
<th>X/L RADIUS</th>
<th>LOADING</th>
</tr>
</thead>
<tbody>
<tr>
<td>-.43322</td>
<td>.03871</td>
</tr>
<tr>
<td>-.39944</td>
<td>.15172</td>
</tr>
<tr>
<td>-.33418</td>
<td>.37217</td>
</tr>
<tr>
<td>-.24188</td>
<td>.65812</td>
</tr>
<tr>
<td>-.12884</td>
<td>.86934</td>
</tr>
<tr>
<td>-.00276</td>
<td>.98553</td>
</tr>
<tr>
<td>.12776</td>
<td>.99496</td>
</tr>
<tr>
<td>.25384</td>
<td>.90868</td>
</tr>
<tr>
<td>.36688</td>
<td>.77627</td>
</tr>
<tr>
<td>.45918</td>
<td>.63125</td>
</tr>
<tr>
<td>.52444</td>
<td>.51506</td>
</tr>
<tr>
<td>.55822</td>
<td>.45206</td>
</tr>
</tbody>
</table>

THE FUSELAGE POTENTIAL LIFT COEFFICIENT = .00699

THE FUSELAGE POTENTIAL MOMENT COEFFICIENT = .01236

LATERAL-DIRECTIONAL STABILITY CHARACTERISTICS WITH JET ON

**STABILITY DERIVATIVES EVALUATED AT ALPHA = 2.000 DEG. AND AT MACH NO.* .400, BASED ON BODY AXES***

<table>
<thead>
<tr>
<th>CYB</th>
<th>CLB</th>
<th>CNB</th>
<th>CLR</th>
<th>CNR</th>
</tr>
</thead>
<tbody>
<tr>
<td>-.1352017</td>
<td>-.0793607</td>
<td>.1744832</td>
<td>-.0844513</td>
<td>.1717479</td>
</tr>
<tr>
<td>.1402299</td>
<td>-.2498866</td>
<td>-.0601710</td>
<td>.0556727</td>
<td>-.0501426</td>
</tr>
<tr>
<td>.1662392</td>
<td>.0556727</td>
<td>.0501426</td>
<td>.0500356</td>
<td></td>
</tr>
</tbody>
</table>

**STABILITY DERIVATIVES BASED ON STABILITY AXES***

<table>
<thead>
<tr>
<th>CYB</th>
<th>CLB</th>
<th>CNB</th>
<th>CLR</th>
<th>CNR</th>
</tr>
</thead>
<tbody>
<tr>
<td>-.1352017</td>
<td>-.0844513</td>
<td>.1717479</td>
<td>-.0532004</td>
<td>-.0500356</td>
</tr>
<tr>
<td>.1460327</td>
<td>-.2500436</td>
<td>-.0532004</td>
<td>.0626434</td>
<td>.0500356</td>
</tr>
<tr>
<td>.1613442</td>
<td>.0626434</td>
<td>.0500356</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

LATERAL-DIRECTIONAL STABILITY CHARACTERISTICS WITH JET OFF
**STABILITY DERIVATIVES EVALUATED AT ALPHA = 2.000 DEG. AND AT MACH NO. = 0.400, BASED ON BODY AXES***

CYB = -0.1348120 CLR = -0.0769513 CNB = -0.1746655  
CYP = 0.0862459 CLP = -0.2410532 CNP = -0.0355239  
CYR = -0.1676378 CLR = 0.0575684 CNR = -0.0514798  

**STABILITY DERIVATIVES BASED ON STABILITY AXES***

CYB = -0.1348120 CLB = -0.0830483 CNB = -0.1719794  
CYP = 0.0970986 CLP = -0.2404582 CNP = -0.0269065  
CYR = -0.1646272 CLR = 0.0591837 CNR = -0.0520748
References


Computer Program Listing

The following is a listing of the 5,427 separate cards which constitute the computer program.
OVERLAY (WNGJET,0,0)
PROGRAM WNGJET(INPUT,OUTPUT,TAPE5=INPUT,TAPE6=OUTPUT,TAPE1=TAPE2,TAPE3=TAPE4,TAPE7=TAPE8,TAPE9)
   AERODYNAMICS OF WING-JET INTERACTION
   BY C. EDWARD LAM OF THE UNIVERSITY OF KANSAS
   THIS PROGRAM IS APPLICABLE TO BOTH UPPER SURFACE BLOWING AND OVER-
   WING BLOWING CONFIGURATIONS.
   NOTF. ROOT AND TIP CAMBER FUNCTIONS MAY BE DEFINED AS FUNCTION
   SUPROGRANS ZCR(X) AND ZCT(X), RESPECTIVELY.
   THE ARRAY DIMENSIONS OF THIS PROGRAM RESTRICT THE NUMBER OF WING
   VORTICES TO BE 100 MAXIMUM AND THE TOTAL WING AND JET VORTICES TO
   200 MAXIMUM. ALSO, CHECK THE ARRAY SIZE OF GAMMA IN SUBROUTINE
   "SOLUTN" BEFORE USING THE PROGRAM.

DIMENSION TITLE(13)
COMMON /SKODE/ KCODF
COMMON /SCHEME/ C'(2).X(10,41) Y(10,41),SLOPE(15).XL(2,15).XRT(41)
   IXL(41)
   Z2(200).XWIDT(8).YCON(25).SWEEP(50).HALFB.5J(21.8).EX(95.2).TX(95)
   X3.2.SC(160.5).SI(160.5).LC(3)
COMMON /SOME/ KX.WING.LAT.NAL.LWF.LWFJ.CHORDT(3).SNGL(5).YE(5)
   YCN(6).WKN.PDX.MDG.
COMMON /CONST/ NC.SCN.WT(8).NSJ.KCJ(5).LAST.MJK3.35.MKJ2.35.
   JDL(3)
COMMON /PARAM/ ALP1.4LPC.4LPS.CDF.4SF.TH.TNF
   LDS(320)
COMMON /COST/ LTOTA.IPAN1.1NJW(5).LPAN1.1FNT.1NLPAN2.1PTL.
   TWLDS(330)
COMMON /CAM/ ICAM.IMXT(2,11).IZC(2,11).AMM(2,10).BBM(2,10).CCM(2)
   LDS(360)
DIMENSION IARY(6)
DATA IARY/4*(-0)9(0)/
SYSTEMC SUPPRESSES THE PRINTING OF NON-FATAL ERROR MESSAGES IN
THE EVALUATION OF (EXP(A)), WHEN (A) IS LESS THAN (-675.84) ON
CYBER-175. THIS CALL MIGHT NOT BE NEEDED FOR OTHER COMPUTING
SYSTEMS.
CALL SYSTEMC (115,1ARY)
PI=3.14159265
READ (5,70) (TITLE(I),I=1,13)
WRITE (6,80)
WRITE (6,70) (TITLE(I),I=1,13)
WRITE (6,80) 
NCON=1  
***NUMBER OF CASES TO BE RUN, GEOMETRY CODE (=1 IF GEOMETRY VARI- 
ES, 0 FOR THE SAME GEOMETRY, 1 IF GEOMETRY VARIES, =0 FOR THE SAME GEOME-
TRY, IF GEOMETRY VARIES) 0 FOR THE SAME GEOMETRY, 1 IF GEOMETRY VARIES, =0 FOR A CENTERED 
CASE, AND 1 OTHERWISE) ***  
***LATERAL NODE SELECTOR (=N FOR SYMMETRICAL MODE OF MOTION, AND =1 
IF LATERAL-DIRECTIONAL DERIVATIVES ARE TO BE COMPUTED) ***  
READ (5,60) ICASE,G,ISYM,LAT  
WRITE (6,60) ICASE,G,ISYM,LAT  
CONTINUE  
WRITE (6,90) 
WRITE (6,100) NCON  
WRITE (6,90) 
CALL OVERLAY (H,NGJET,1,0)  
J=1+W+1  
CALL OVERLAY (H,NGJET,2,0)  
CALL OVERLAY (H,NGJET,3,0)  
CONTINUE  
CALL OVERLAY (H,NGJET,4,0)  
CALL OVERLAY (H,NGJET,5,0)  
NCON=NCON+1  
IF (NCON,GT,I40) GO TO 10  
IF (NG,GT,ICASE) 60 TO 40  
IF (NG,GT,ICASE) 60 TO 40  
READ (5,50) ALP  
ALP=ALP*PI/180.  
ALPS=SIN(ALP)  
ALPC=COS(ALP)  
ALPT=ALPS/ALPC  
DO 30 I=INCS  
XLL(I)=ALP*(T+STR+TWIST*YIE(I)/HALFR)*PI/180.  
T=XLL(I)  
30 XTT(I)=SIN(T)/CCS(T)  
WRITE (6,90) 
WRITE (6,100) NCON  
WRITE (6,90) 
CONTINUE  
STOP  
FORMAT (6F10.5)  
FORMAT (7(6X,14))  
70 FORMAT (13A6)
```fortran
90 FORMAT (40H*************************************************************************)  LDS 990
90 FORMAT (1HO*20X,25HXXXXXXXXXXXXXXXXXXXXXXXXXX)   LDS1000
100 FORMAT (1HO*25X*13+CASE NUMBER =,I2)          LDS1010
      END
      LDS1020-
FUNCTION ZCR (X)
COMMON /CAMB/ ICAM, IM,XT(2,11), ZC(2,11), AAM(2,10), BMM(2,10), CCM(2, ZCR 20
110), DDM(2,10)
      IF (ICAM.EQ.1) GO TO 10
      ZCR 10
C *** CAMPER FUNCTION FOR THE ROOT SECTION ***
C
      IF (X.LT.0.2025) ZCR=2.6E95*(3.*X*X-1.215*X+0.114715)
      IF (X.GE.0.2025) ZCR=-0.0220P
      GO TO 20
      ZCR 20
      RETURN
      ZCR 210
      END
      ZCR 130-
FUNCTION ZCT (X)
COMMON /CAMR/ ICAM, IM,XT(2,11), ZC(2,11), AAM(2,10), BMM(2,10), CCM(2, ZCT 20
110), DDM(2,10)
      IF (ICAM.EQ.1) GO TO 10
      ZCT 10
C *** CAMPER FUNCTION FOR THE TIP SECTION ***
C
      ZCT=ZCR(X)
      GO TO 20
      ZCT 20
      RETURN
      ZCT 210
      END
      ZCT 120-
FUNCTION ZCA (I*X)
COMMON /CAMP/ ICAM, IM, XT(2,11), ZC(2,11), AAM(2,10), BMM(2,10), CCM(2, ZCA 20
110), DDM(2,10)
      K=I
      ZCA 10
      IF (X.GE.XT(I,K).AND.X.LT.XT(I,K+1)) GO TO 20
      K=K+1
      IF (K.GE.IM) GO TO 10
      ZCA 10
      SM=X-XT(I,K)
      ZCA=3.*AAM(I,K)*SM*SM+2.*BMM(I,K)*SM*CCM(I,K)
      GO TO 50
      ZCA 50
      IF (X.LT.XT(I,1)) GO TO 40
      K=IM-1
      GO TO 30
      ZCA 30
      IF (X.LT.XT(I,1)) GO TO 40
      K=1
      GO TO 20
      ZCA 20
      GO TO 20
      ZCA 20
      PFTLRN
      ZCA 50
      COMMON /FUSRAD/ IFR, IFN, XFF(21), RFF(21), AAF(20), BBF(20), CCF(20), PCFUR 20
```

IF(20)
   IF (IFR.NE.0) GO TO 30
   C * DEFINE THE FUSELAGE RADIUS AS A FUNCTION OF X *
   C
      IF (X.LT.(-0.127)) GO TO 10
      IF (X.GT.0.381) GO TO 20
      FUR=0.161
      GO TO 80
      10 FUR=0.161*SQRT((1.-(X+0.777)/0.65)**2)
         GO TO 80
      20 FUR=0.161*SQRT((1.-0.8695659*(X-0.381)))
         GO TO 80
      30 CONTINUE
      K=1
      40 IF (X.GE.XFF(K).AND.X.LT.XFF(K+1)) GO TO 50
         K=K+1
      IF (K.GE.IFN) GO TO 20
         50 MP=C=y-XFF(K)
            FUR=AAF(K)*MP+PVF(K)*C**2+CCF(K)*SM+PDF(K)
               GO TO 20
            60 IF (X.LT.XFF(1)) GO TO 70
               70 K=IFN-I
                  30 TO 50
            80 RETURN
END

FUNCTION SLOP (X)
COMMON /FUSRAD/ IFR,RIFN,XFF(21),RFF(21),AAF(20),BBF(20),CLF(20),DSL
1F(20)
   IF (IFR.NE.0) GO TO 30
   C * DEFINE THE DERIVATIVE OF FUSELAGE RADIUS WITH DIMENSIONAL X *
   C MULTIPLIED BY RADIUS OR, =R(DF/DX) *
   C
      IF (X.LT.(-0.127)) GO TO 10
      IF (X.GT.0.381) GO TO 20
      SLOP=0.
      GO TO 80
      10 SLOP=0.0399*(1.-(X+0.777)/0.65)
        IF (ARS(X+0.777).LE.0.001) SLOP=0.
           GO TO 80
      20 SLOP=0.0140P7
         GO TO 80
      30 CONTINUE
      K=1
      40 IF (X.GE.XFF(K).AND.X.LT.XFF(K+1)) GO TO 50
K = K + 1
IF (K.GE.IFN) GO TO 60
GO TO 40

50 SW = X * XFF(K)
SLP = 3. * AAF(K) * SM**2 + 2. * BRF(K) * SM * CCF(K)
SLP = SLP * FUR(X)
GO TO 80

60 IF (X.LT.XFF(1)) GO TO 70
K = IFN - 1
GO TO 50

70 K = 1
GO TO 50

80 RETURN
END

SUBROUTINE VMSEON (NC1, K, AA, A, CA)

C TO SOLVE THE SIMULTANEOUS EQUATIONS BY PURCELL's VECTOR METHOD

DIMNSION AA(1), CA(1), A(1)
NC = K * NC1
SUM1 = 0.
K1 = K - 1
JJ = 1.
DO 10 J = 1, K1
SUM1 = SUM1 + AA(J) * A(JJ)
10 JJ = JJ + NC1 + 1
SUM1 = SUM1 + AA(K)
DO 30 I = 1, NC1
SUM2 = 0.
JJ = I + 1
DO 20 J = 1, K1
SUM2 = SUM2 + AA(J) * A(JJ)
20 JJ = JJ + NC1 + 1
SUM2 = SUM2 + AA(KK)
KK = K + 1
SUM2 = SUM2 + AA(KK)
CA(I) = -SUM2 / SUM1
M = 1
L = 0
KNC = (K - 1) * NC1
DO 60 I = 1, NC
IF (I.EQ.KNC) GO TO 50
MM = (M - 1) * NC1 + 1
IF (I.EQ.MM) GO TO 70
40 KK = KK + 1
IL = I + L
A(I) = CA(KK) * BASE + A(IL)
GO TO 60
50 II = I - KNC
A(I) = CA(II)
60 CONTINUE
II=MM+1
BASE=A(I)
KK=0
L=L+1
M=M+1
GO TO 40
CONTINUE
RETURN
ENC

SUPROUTINE INTEG (F,NN,LJ,17,1,J,B,IR)
C TO MAKE REFINED INTEGRATION FOR INDUCED TANGENTIAL VELOCITIES
COMMON /GEOM/ WLSW,XCP(200),YCP(200),ZCP(200),XLE(50),YLE(50),XINT 30
E(50),PSI(20),CR(95),YV(200),SN(8,8),KN(208,2),YN(208,2),ZINT 40
N(200,2),WIDTH(9),YCON(5),SWEEP(5),HALF8(9),(21,8),EX(95,2),TX(95,2)
3,2),SC(160,5),SI(160,5),LC(3)
INT 60
PI=3.14159265
INT 70
J=JJ+1
JJ=NN*16
IF (NN+CT,6) JJ=NN*8
FJ=JJ
C1=TX(I2,1)-EX(I7,1)
C2=TX(I2,2)-EX(I7,2)
SUW=0
DO 10 K=1,JJ
XX1=EX(I2I)+CIPSC(KIR)
XX2=EX(I2,2)+C2*SC(KTR)
X1=XX1-XCP(IJ)
X2=XX2-XCP(IJ)
Y1=YN(IJ,1)-YCP(IJ)
Y2=YN(IJ,2)-YCP(IJ)
Z1=ZN(IJ,1)-ZCP(IJ)
Z2=ZN(IJ,2)-ZCP(IJ)
X12=X12=XX1
Y12=Y12=YN(IJ,2)-YN(IJ,1)
Z12=Z12=ZN(IJ,2)-ZN(IJ,1)
XYK=X12*Y12=Y1*X12
XZU=X12*Z12-Z12*Y12
ALE=XYK*XYK*Z12*Z12*B*Y1*Y1*Z12
R1=SORT(X1*X12+B*Y1*Y12+B*Z12*Z12)
R2=SORT(X2*X2+B*Y2*Y2+B*Z2*Z2)
UU=(X2*X2+B*Y2*Y2+B*Z2*Z2)/P2=(X1*X12+B*Y1*Y12+B*Z12*Z12)/R1
SUP=SUM+UU*Y1/ALB+PSI(K,IN)
F=5*SM*CH(IZ)/(P,FJ)
RETURN
ENC

SUPROUTINE FUSELA (NF,AN,NN,I,S,XT,FX,XF,RF,EB,SNP,NKF,KZ)
DIMSIZIN AN(1), XF(1), RF(1), XCF(1), SNP(5,20), S(1), NKF(1)
PI=3.14159265
IK=0
N1=NKF(1)
N2=1
HL=(S(?)-S(I))/2,
FNT=NKF(1)
A1=XCF(I)-XTEF
A2=SQRT(A1*A1+PF(I)*PF(I))
DO 40 JJ=1,NF
M=JL-IK
XS=XCF(I)-XF(JJ)
XSP=SQRT(XS*XS+FP*PF(I)*PF(I))
IF (N,F,0) GC TC PN
RFL=1.
IF (N,GE.2) GO TO 10
IF (I,GF,NF) RFL=0.
IF (I,AF,NF) RFL=(A1*A2)*A1/A2
CONTINUE
RFLN=R(XS*XSP)*A1/XSP
GO TO 30
IF (I,AF,KF) RFL=1
IF (I,EC,NF) RFL=0.
RFL=XS/XSP
AW(JJ)=-HL*(RFL-PFL)*N2P(J,J2)/(4.*FNT)
IF (JJ,NE,N1) GO TO 40
N2=N2+1
IK=IK+1
N1=N1+NKF(N2)
HL=(S(?)-S(I))/2.
FNT=NKF(N2)
CONTINUE
RFLAN
END

SURFOUTHE UNWF (P,XY,YY,7,40,A4,F1,4,61,KL,0F7,1K)
DIMENSION AW(1), PIV(1)
COMMON /SCHIFEE / C(2),X(10,41),Y(10,41),SLOP(15),XL(2,15),XTT(41)
1XL(41)
COMMON /FUS/ XF(70),XCF(20),PF(20),SMP(6,70),XLFF,XTEF,KARF(20),NKNF 50
1UNWF,HT,CSF(6',10),XAS(6),NKF(6),F0,F10,KF,ATS
P=SQRT(YY*YY+7*7)
IF (7) 10.20,30
THETA=ATAN(YY/PA(7))
IF (7) 10.20,30
THETA=ATAN(YY/AFS(7))
GO TO 40
THETA=PI-ATAN(YY/AFS(7))
GO TO 40'}
CT = COS(T + FTA)
DO 100 N = 1, NT
FNF = NKF(N)
IK = 0
N1 = NKF(N)
N2 = 1
S = XAS(2) - XAS(1)
FNF = N
FLT = 0,
FIR = 0,
IF (N.GF.2) GO TO 50
A3 = (A1 + A2) / R
FLT = A3 / FN
FLF = A1 / F * A3 / A2
CONTINUE
DO 50 JJ = 1, NF
U = U - IF
K = U + (H - 1) * N
XS = XX - XF(J)
XS = SQRT(XS + YF + P * P + R)
XR = ((XS + XSR) / P) * N
FTX = XP / PN
FRX = XS / FR * XR / XSR
P1 = S * (FPX - FLP) * SNP(N2, M) / (P * PNF)
P2 = S * (FTX - FLT) * SNP(K2, M) / (P * PNF)
Q1 = COS(FN * THETA)
Q2 = SIN(FN * THETA)
UR = C1 * P
UI = -P * F2 * P
VR = C2 * P
V1 = FNF * C1 * P
VR = V1 / P
VT = V1 / P
UT = UT / P
IF (JJ.NF.N1) GO TO 60
N2 = N2 + 1
IK = IK + 1
N1 = N1 + NKF(N2)
S = XAS(K + R + 1) - XAS(I)
FNF = NKF(N)
60 IF (KL.GR.1) GO TO 80
IF (ID.GR.2) GO TO 70
RW(K) = VP * CT - VT * ST
AW(K) = L * CT - UT * ST
GO TO 50
70 RW(K) = VP * ST + UT * CT
GO TO 90
80 RW(K) = (VR + ST + VT + CT) * Y(4, IPH) + (UR + CT - VT * ST) * Y(2, IPH)
AW(K) = (VR + ST + UT + CT) * Y(4, IPH) + (UR + CT + UT * ST) * Y(2, IPH)
90 CONTINUE
CONTINUE
IF (KL.NE.1) GC TO 110
RFL=AI/R*([A]+A7)/PA8
XP=XY-XLEF
A6=SQRT(XP*XP+PA*PA)
PP0=XP/R*([XP]+PA)/PA6
UR=CT=(RFL-RF0)/(4.*PI)
TL=(A)*A2)/R
TO=(XP+A6)/R
UT=STo((TL-To))/(4.*PI)
UT=LT/R
WK2=(UT*CT+UT*CT)*Y(4,IPHI)*(UT*CT-UT*CT)*Y2(IPHI)
CONTINUE
RETURN
END

SUBROUTINE FUSVCL (R,XY,Z,WK,XCF,RF,WRF,KRF1,RF1)
COMMON /FUS/; XCF(20),RF(20),WRF(5,20),XLEF,XLEF,
KRF(20),ACF
1UN,AT,CSF(5,10),XAS(6),AFL(15),F0,F10,KA,AT
R=SQRT(Y*Y+Z)*
PI=3.14159265
IF (7) 10,20,1
10 THTA=PI-ATAN(Y/PI
GO TO 40
20 THTA=PI/2.
GO TO 40
30 THTA=ATAN(Y/PI
40 A1=X-XLEF
A2=SQRT(A1*A1+PA*PA)
PP=(A1)^2/R
YP=X-XLEF
R2=SQRT(XP*XLEF+PA*PA)
PP0=XP/R/PA
FP=[(A1+A2)/PA*(YP*YP)/PA+XP]/PA
CF=COS(THTA)
SH=SIN(THTA)
WN=0.
IF (P7.NE.0) GC TO 60
IF (L.NE.0) GC TO 90
IK=0
N1=AFL(1)
N2=1
FN0=AFL(1)
S=XAS(2)-XAS(1)
WN=0.
NC=0, NC=1,AF
NK=J+TK
X8=X-XF(J)
X8F=SQRT(X8*X8+CP*CP)
FRL = XS/XSR/R
WN = WN * (PFL - RFX) * VAR(D) * SNAP(N2,N) * R/FAF
IF (J.NE.N1.OR.J.EQ.AF) GO TO 50
N2 = N2 + 1
IK = 1
N1 = K + NKF(N2)
S = XAS(N2) - XAS(H2)
FNF = NKF(N2)
50 CONTINUE
WN = WN + PT/2.
WN = WN + (PFL - FF0) * F0 * (4. * PI)
WN = WN + CS
FP = FF0
S1 = SN
S2 = CS
GO TO 90
60 FP = FF0
IF (WK.GT.0.9) GO TO 70
S1 = CS
S2 = SN
GO TO 90
70 S1 = SN
S2 = CS
GO TO 90
80 CONTINUE
WN = WN - S1 * FT*FP/R/(4.*PI) - CS*SF*FP*FP/(4.*PI)
90 CONTINUE
WK = (-S1 * CS*FT/R-CS*CS*FP)/(4.*PI)
RETURN
END
SUBROUTINE FSPEEC (P*X,Y,7*EAV,WK1,WK2)
DIMENSION EAV(2)
COMMON /FSUS/ XE(20),XF(20),PF(20),S2P(5,20),XLFF,XTEF,VAR(20),NKF
LUM,AFMT,CSF,F*10,XAS(6),NKF(5)*F0,F10*KF,NFL
P1 = 2.14159265
P = CCPT(Y*Y+7*7)
THETA = ATAN(Y/APS(7))
GO TO 40
20 THETA = PI/2.
GO TO 90
30 THETA = ATAN(Y/APS(7))
40 A1 = X - XFF
A2 = SQRT(A1*A1 + P0*P0)
RFL = -(A1 + A2)/R/A2
DO 60 I = 1,NT
FI = I
CS = COS(FI * THETA)
SS = SIN(FI * THETA)
IF = 0
60 CONTINUE
FSL 350
FSL 360
FSL 370
FSL 380
FSL 390
FSL 400
FSL 410
FSL 420
FSL 430
FSL 440
FSL 450
FSL 460
FSL 470
FSL 480
FSL 490
FSL 500
FSL 510
FSL 520
FSL 530
FSL 540
FSL 550
FSL 560
FSL 570
FSL 580
FSL 590
FSL 600
FSL 610
FSL 620
FSL 630-
FSD 10
FSD 20
FSD 30
FSD 40
FSD 50
FSD 60
FSD 70
FSD 80
FSD 90
FSD 100
FSD 110
FSD 120
FSD 130
FSD 140
FSD 150
FSD 160
FSD 170
FSD 180
FSD 190
FSD 200
N1=NKF(N2)
N2=1
HL=0.5*(XAS(1)+XAS(2))
FNT=NKF(1)
DO 50 JJ=1,NF
J=JJ+1*NF
M=JJ+IK
XS=X*XF(JJ)
XSP=SQRT(XS*XSP+P*P)
RL=RFL
IF (I.GE.2) RL=0.
RX=((XS+XSP)/P)*I/XSP
GAN(2,J)=L*C5*(RX-FL)*SNP(N2).*FNT
GAN(1,J)=L*SS*(RX-FL)*SNP(N2).*FNT
IF (J.JE.NF) GO TO 50
N2=N2+1
IK=1
N1=N1+1
NL=0.5*(XAS(N2+1)+XAS(N2))
FNT=NKF(N2)
CONTINUE
40 CONTINUE
XP=X+YLEF
A6=SNP(XSP+P*P)
RFO=-((XP+PX)/P)*A6
WK2=-CCS(THTA)*(RFL-RFO)/(N2*PI)
WK1=-SIN(THTA)*(PFL-RFO)/(N2*PI)
RETURN
END
DO 150 I=1,NT
REWIND 98
N=I
GO TO 140 J=1,NF
JJ=J
DO 110 K=1,LPL
KT=K
IF (IL.EQ.2.AND.K.LT.LPLAFL) KI=K+JPLAFL
IF (IL.EQ.2.AND.K.GT.LPLAFL) KI=K-LPLAFL
READ (10) (Bk(KK),KK=1,NCUW)
READ (10) (Dw(KK),KK=1,NCUW)
AN=0.
RN=0.
DO 100 KK=1,NCUW
IF (NH1.NE.0.AND.K.LE.NH1) GO TO 80
FCUV=NCLW-NH1
PP=FI-TH1
GO TO 90
FCUV=NH1!
PP=TH1
90 CONTINUE
RA=RN*FW(KK)+CF(I,KK)*PP/FCUV
AN=AN+FW(KK)+CF(I,KK)*PP/FCUV
AN=AN+2./PI
RN=RN+2./PI
CW(KT)=PF*RF(J)@@@(I+1)
110 AW(KT)=CF*RF(J)@@@(I+1)
DO 130 KK=1,NF
N=(I-1)*NF+1
N2=I*NF
N2=K*LPL
NN=KK-N1+1
AW(NP)=0.
CW(NP)=0.
GO TO 120
120 CONTINUE
WRITE (01) (CW(K),K=1,LPW)
RETURN
END

SUBROUTINE WING (AW*,PW*,LPLAFL*,I*,FP*,LPLA1*,LPLA2*,KF)
DIMENSION AW(1), PW(1)
QIMENSION W(1)
COMMON /GEO*/ HALFSW*,XCP(200),YCP(200),7CP(200),XLF(50),YLE(50),XTWING 40
1E(5), PST(20), CH(95), XV(200), YV(100), SN(2), XN(200), YN(200), ZWN 50
2N(200), WIDTH(2), YCON(25), SWFM(50), HALFR, SJ(21), EX(95), TX(95), WNG 60
3*2, ST(160), ST(160), LT(3) WNG 70
COMMON /AFRO/ AM1, AM2, B1, P2, CL(30), CT(30), CP(30), GAM(2,130) WNG 80
COMMON /CONST/ NSJ, HCJ(5), LAST, MJW1(3,5), MJW2(3,5), WNG 90
1PANFL+Y(J+5)+K(J+3)+R(J+1) WNG 100
IP=1 WNG 110
I2=1 WNG 120
IF=1 WNG 130
IS=1 WNG 140
NL=1W(1) WNG 150
D0 =0 J=1,2KANFL WNG 160
M=J-JFF+1 WNG 180
FN=NL WNG 200
IF (J, Eq, (LPAN1+2), LE, LPAN1) IP=1 WNG 210
IF (J, Eq, LPAN1, AN, LE, LPAN2) IS=2 WNG 220
IF (J, Eq, LPAN2, AN, LE, LPANFL) IS=3 WNG 230
GO T0 20 WNG 240
10 NL=1W(2) WNG 250
IF (J, Eq, LPAN2, AN, LE, LPANFL) HL=1W(3) WNG 260
20 CONTINUE WNG 270
X1=XN(J+1)-XCP(I) WNG 280
X2=XN(J+2)-XCP(I) WNG 290
X12=XN(J+2)-XN(J+1) WNG 300
Y12=YN(J+2)-YN(J+1) WNG 310
Z12=ZN(J+2)-ZN(J+1) WNG 320
Z1=ZN(J+1)-ZCP(I) WNG 330
Z2=ZN(J+2)-ZCP(I) WNG 340
X7J=X12-Z12*Z1? WNG 350
DO =0 II=1,7 WNG 360
IF (II, Eq, 1) GC T0 30 WNG 370
N=1 WNG 380
GO TO 40 WNG 390
30 N=2 WNG 400
GO TO 40 WNG 410
40 CONTINUE WNG 420
YC=1, +Y*YCP(I) WNG 430
Y1=YN(J+1)-Y WNG 440
Y2=YN(J+2)-Y WNG 450
XYK=X12*Y12-Z12*Y12 WNG 460
Y21=Y12*Z12-Z12*Y12 WNG 470
ALB1=XYK*XYK+X7J*Y7J+RF*YJ*YJ WNG 480
B1F=SGRT(X12*Y12+Y12*Y12+RF*Y12*Y12) WNG 490
R2B1=SGRT(X12*X12+Y12*Y12+RF*Y12*Y12) WNG 500
UUE1=(Y2*Y12+RF*Y2*Y12+RF*Y12*YL2)/RP P1=(Y12*Y12+RF*Y12*Y12+RF*Y12*Y12) WNG 510
1)F1R1 WNG 520
61F1=(I-X1)/R1F1)/(Y1*Y1+Y1*71) WNG 530
G2P1=(I-X2)/P2F1)/(Y2*Y2+72*72) WNG 540
F1=URL*XYK/ALB
F2=−Y2*G2B1+Y1*G1B
W(I+2)=(F1+F2)*CH(I7)*SN(W1*:ISK)/(R,*FN)
IF (IP,EQ.1, AND, KF,NE.0) F2=−Y2*G2B1
50 W(I)=(F1+F2)*CH(I7)*SN(W1*:ISK)/(R,*FN)
AW(U)=W(1)+W(2)
RW(U)=W(3)−W(4)
IF (J,LT,NN,OR,J,F0,LPANEL) GO TO 60
IP=IP+1
IZ=I+1
TFF=NN+1
NN=NN+1
60 CONTINUE
RETURN
FND
SUBROUTINE UAFW (LAST,LPANEL,P1,LPAN),LPAN?,NW,A,BW,MUJ,IL,NCJ,NJUNW 10
1H,NP)
11M,FSN,IGN SF(10), CF(10), AK(1), A(4), NW(1), P(1)* MUJ(1)* NCJ(1)*NUNW 30
I
COMMON /FUS/ XF(20),XCF(20),RF(20),SNP(5,20),XLEF,XTEF,WARD(20),NCUNW 50
1UM,NT,CSF(5,10),YAS(6),NKF(5),F0,F10,KT,ATL
1COMMON /G0M/ HALFSW,XCF(200),YCP(200),ZCP(200),XLF(50),YLE(50),XTUNW 70
IF (0),PSI(20),CH(55),XV(200),YV(100),SN(B,P),XN(200,2),YN(200,2),ZUNW 90
2N(200,2)*INTP(A),YCP(200)*YCF(50),HALF,SJ(21,P),EX(95,2),TX(95UNW 3,2),SC(160,5),ST(160,5),LC(3)
3,2,14159265
PI=3,14159265
REWIND 02
TH1=SNP(5,20)
NH1=SNP(5,19)
JG=XT(50)
ICON=LPANEL
IF (IL,LE,2) ICON=LAST
DO 30 I=1,NCLV
IF (NH,NE,0,AND,ILL,LE,NH1) GO TO 10
FI=I−NH1
FCUM=NCUM−NH1
PP=PP+1
30 TP=TH1
GO TO 70
10 FP=I
FCUM=NH1
PP=TH1
TP=0,
20 CONTINUE
T=(F*I+1,)*PF/(P,*FCUM)+TP
CF(I)=COS(T)
SF(I)=SIN(T)
KCA=NF+1
KC=ANCUM
DO 200 I=1,KCON
IF (I,FG,KCON) KC=1
IF=1
I7=1
IFF=1
INC=1
JKT=1
L1=LPANEL+1
LAST1=LAST=1
ISH=1
MN=MW(1)
NN=MW(1)
DO 190 J=1,ICON
MT=J-FF+1
FN=KN
IF (J,GT,LPANEL) GC TO 50
IF (J,FG,(LPAN2+1),OR J,FG,(LPAN2+1)) IP=1
IF (J,GT,LPAN1,AND J,LE,LPAN2) ISH=1
IF (J,GT,LPAN2,AND J,LE,LPANFL) ISH=2
IF (J,GE,LPAN1,AND J,LT,LPANEL) GC TO 40
GO TO 50
NN=MW(2)
CONTINUE
IF (J,GT,LPANEL,AND J,LT,LPANEL) NN=MW(3)
CONTINUE
IF (J,GT,LPANEL,AND J,LT,LPANEL) GC TO 60
GO TO 70
CONTINUE
IF (J,GT,LPANEL,AND J,LT,LPANEL) GC TO 60
GO TO 70
CONTINUE
IF (J,GT,LPANEL,AND J,LT,LPANEL) GC TO 60
GO TO 70
CONTINUE
DO 160 K=1,LC
IF (I,FG,KCON) GC TO 110
X=XCF(I)
Y=RF(I)*SF(K)
Z=RF(I)*CF(K)
GO TO 120
100 X=XLFF
Y=0.
Z=0.
CONTINUE
GO TO 120
UNW 350
UNW 360
UNW 370
UNW 380
UNW 390
UNW 400
UNW 410
UNW 420
UNW 430
UNW 440
UNW 450
UNW 460
UNW 470
UNW 480
UNW 490
UNW 500
UNW 510
UNW 520
UNW 530
UNW 540
UNW 550
UNW 560
UNW 570
UNW 580
UNW 590
UNW 600
UNW 610
UNW 620
UNW 630
UNW 640
UNW 650
UNW 660
UNW 670
UNW 680
UNW 690
UNW 700
UNW 710
UNW 720
UNW 730
UNW 740
UNW 750
UNW 760
UNW 770
UNW 780
UNW 790
UNW 800
UNW 810
UNW P20
UNW P30
DO 150 II=1,2
FCP=1.

IF (II.EQ.2) FCP=-1.

YC=Y*FCP

Y1=YN(J,1)-YC

Y2=YN(J,2)-YC

XYK=X1*Y12-Y1*X1?

YZ1=Y1*Z12-Z1*Y1?

ALP1=XYK*XYK+XZJ*XZ,*B1*YZI*YZI

R1E1=SORT(X1*X1+P1*Y1*Y1+P1*Z1*Z1)

R2E1=SOR T(X2*X2+F1*Y2*Y2+P1*Z2*Z2)

UUE1=(X2*X1+Y1*Y2+P1*Z1*Z2)/F2P1-(X1*X1+Y1*Y1+P1*Z1*Z1) 

1)/F1P1

G1F1=(1.-X1/P1P1)/(Y1*Y1+Z1*Z1)

G2E1=(1.-X2/P2P1)/(Y2*Y2+Z2*Z2)

F1=UUP1*XYK/ALP1

G12=Y2*G2B1+Y1*G1P1

IF (I.EQ.1) GO TO 130

F1=UUP1*XYJ/ALP1

G13=Y2*G2P1-71*G1P1

F1=-F13*SF(K)*FCP+F12*CF(K)

F2=G13*SF(K)*FCP+G12*CF(K)

IF (J.LE.LPANEL) GO TO 140

F1=2.*F1

F2=2.*F2

GO TO 140

130 F1=F12

F2=G12

IF (J.LE.LPANEL) GO TO 140

F1=2.*F1

F2=2.*F2

GO TO 140

140 W(II+2)=(F1+F2)*CHGFD*SN(MI,ISA)/(P.*FY)

IF (IP.NF.1) GO TC 150

G12=Y2*G2B1

E13=Z2*EPB1

F2=G13*SF(K)*FCP+G12*CF(K)

IF (I.EQ.KCON) F2=G12

IF (J.LE.LPANEL) GO TO 150

F2=2.*F2

150 W(II)=(F1+F2)*CHGFD*SN(MI,ICN)/(P.*FN)

IF (I.EQ.KCON) GO TO 160

UNW 840

UNW 850

UNW 860

UNW 870

UNW 880

UNW 890

UNW 900

UNW 910

UNW 920

UNW 930

UNW 940

UNW 950

UNW 960

UNW 970

UNW 980

UNW 990

UNW 1000

UNW 1010

UNW 1020

UNW 1030

UNW 1040

UNW 1050

UNW 1060

UNW 1070

UNW 1080

UNW 1090

UNW 1100

UNW 1110

UNW 1120

UNW 1130

UNW 1140

UNW 1150

UNW 1160

UNW 1170

UNW 1180

UNW 1190

UNW 1200

UNW 1210

UNW 1220

UNW 1230

UNW 1240

UNW 1250

UNW 1260

UNW 1270

UNW 1280

UNW 1290

UNW 1300

UNW 1310

UNW 1320
AW(K)=W(1)*W(2)
BW(K)=W(3)-W(4)

160 CONTINUE
IF (I.EQ.KCON) GO TO 170
WRITE (0) (AW(KK),KK=1,NCW)
WRITE (0) (BW(KK),KK=1,NCW)
GO TO 190

170 AW(J)=W(1)*W(2)
190 CONTINUE
IF (J.LE.KPANEL) GO TO 190
IF (J.LT.m) IF=IP+1
IF=IP+1
IP=IP+1
IP=IP+1
J=J+1
J=J+1
J=J+1
IF (J.GT.LPANEL) JKT=JK+1
IF (JKT.EQ.(NP+1)) JKT=1
IF (I.EQ.KCON) GO TO 200
WRITE (0) (AW(KK),KK=1,NCW)
CONTINUE
CONTINUE
RETURN

C

C TO SET UP THE GEOMETRY OF THE VOPTEX ELEMENTS AND CONTROL POINTS
DIMENSION XYL(5), YIL(5), XXT(5), YIT(5), CPCWL(32), CPSW(32)
COMMON /SCHEME/ X(10,41), Y(10,41), SLOPE(1S), XL(2,15), XTT(41)
1XLL(41)
COMMON /GEOM/ HALFSX,XCP(200),YCP(200),XLE(50),YLE(50),XTXGE0 70
1X(5), PSIT(50), CV(95), PV(200), PV(50), YV(100), SN(8,P), XA(200,2), YN(200,2), XG6E0 80
2N(200,2), WDF(10), YCON(25), SWFFP(50), HALBF, SJ(21,P), EX(51,2), TX(956E0 90
3,2), SC(160,5), ST(160,5), LC(3)
COMMON /SKODE/ KCCOE
COMMON /AFRO/ AW,AP,P1,P2,CL(30), CT(30), CO(30), GAK(2,130)
COMMON /SOME/ HC,NWIN, LALT,HAL, LWF, LWFJ, CHG, SC(5), YE(5), YC60 100
1(6), WKN, PDX, MCG, ADG
COMMON /FUSFA/ IFP, IFA, XFX(21), RFF(21), AAF(20), RBF(20), CCF(20), DDE0 150
IF(20)
COMMON /FUSS/ XF(20), YCF(20), PF(20), SVP, XSF(10), XLEF, XTEF, WARC(20), NCF, 170
1W, AKF, NT(5,10), XAS(6), AKF(5), AN, F10, F10, XTL
COMMON /CONST/ NCS, NCHW, M1(8), NSJ, KJ(5), LAST, N1, WN, WJ, WV, J, JG0 150
1 PANEL, NWJ(5), NWJ(5), XWJ(5), AN, ANJ, NJP
COMMON /PARK/ ALPT, ALPC, ALPS, CDF, SDF, TH, TDF
COMMON /ADD/ CP(130), CM(70), PPFAK(50), SFPW, (R,15), GAL(30), ISYM, VMU, VUEG0 220
1, TEMP, FCR, CAMLET, CAPLET, CAPFTR, TCF, XP, Y, J, R, ALP, CREF, T5WTR, G0E0 230
COMMON /COST/ LCTILP, LPAN1, NWJ(5), LPAN2, EXIT*, PST, T1, T2G0 240
LST, DF, NJP
COMMON /CAMB/ ICA, IM, XT(2,11), ZC, AM, AM, BPM(10), CCP(2,6E0 250

THE ORIGINAL PAGE IS OF POOR QUALITY
C * ***MACH NUMBERS OF FRESTREAM AND JET FLOW, FRESTREAM/JET VELOCITY RATIO, JET FRESTREAM TEMPERATURE RATIO, ANGLE OF ATTACK IN DEGREES, * NEWLINE
C * WING L.E. AND T.F. X-COORDINATES AT THE JET AXIS LOCATION *** * NEWLINE
C
C READ (F,570) AM1,AM2,VMPS,TFMPS,ALPS,XEL,XET
C WRITE (F,620) AM1,AM2,VMPS,TFMPS,ALPS,XEL,XET
C
C C ** *NUMBER OF FLAP SECTIONS (INCLUDING THE JET SPAN), THE NUMERICAL ORDER OF JET SPAN AND THE CORRESPONDING FLAP DEFLECTION ANGLES IN DEGREES *** * NEWLINE
C
C READ (F,610) NFP,NJP,(DF(I),I=1,NFP)
C WRITE (F,610) NFP,NJP,(DF(I),I=1,NFP)
C
C C ** REFERECE HALFWING AREA, REFERENCE CHORD, TWIST IN DEG., INCIDENCE ** * NEWLINE
C
C READ (F,570) HALFSW,CREF,TWIST,TWISTP,XJ,YJ,7J,RJ
C WRITE (F,570) HALFSW,CREF,TWIST,TWISTP,XJ,YJ,7J,RJ
C
C C *** TAIL-EDGE ANGLE IN DEG., PARTIAL-SPAN FLAP INDICATOR (=0, FOR NO, FOR 1, OTHERWISE) CONFIGURATION INDICATOR (=1, FOR USB, AND =0, FOR OWE), L.E. CAMPFAT AT THE ROOT AND TIP ** * NEWLINE
C C * NOTE: FOR USB APPLICATIONS, YJ7J AND RJ MAY BE ANY NON-ZERO VALUES ** * NEWLINE
C * UNLESS THE RECTANGULAR JET IS NOT ON THE SURFACE AND THE ENTRAINMENT EFFECT IS TO BE ACCOUNTED FOR *** * NEWLINE
C
C IF (RJ.LE.0.0001) RJ=1.
C IF (RJ.LE.0.0001) RJ=1.
C IF (RJ.LE.0.0001) RJ=1.
C IF (RJ.LE.0.0001) RJ=1.
C IF (RJ.LE.0.0001) RJ=1.
C IF (RJ.LE.0.0001) RJ=1.
C IF (RJ.LE.0.0001) RJ=1.
C IF (RJ.LE.0.0001) RJ=1.
C IF (RJ.LE.0.0001) RJ=1.
* THE FOLLOWING DATA ARE NOT NEEDED FOR OUR APPLICATIONS *
IF (IUSE.NE.1) GO TO 20

** THRUST COEFFICIENT, JET DEPRESSION ANGLE IN DEG., AND ENTRAINMENT **
COPE IF THE RECTANGULAR JET IS NOT ON THE WING SURFACE (=1, IF THE)
ENTRAINMENT DUE TO AN EQUIVALENT ROUND JET IS TO BE INCLUDED, =0.

READ (5,570) CML,DFJ,TNJ
WRITE (6,570) CML,DFJ,TNJ
CONTINUE
DFJ=DFJ*PI/180.
CDF=DFJ
DO 30 I=1,5
30 DF(I)=DF(I)*PI/180.
TDF=DF(1)*PI/180.
ALP=ALP*PI/180.
ALPS=SIN(ALP)
ALPC=CA(S(ALP)
ALPT=ALPS
DF=TEAR*PI/180.*CDF
IF (IUSE.EQ.1) CDF=DFJ
EXIT=0.
IF (XJ.GT.XEL) EXIT=1.
XEL=(XFL-XJ)/PJ
XET=(XFT-XJ)/PJ
7=7PJ/PJ
TH=0.
M1(4)=0.
ITN=TNJ.
YCON(23)=TNJ.
IF (IUSE.EQ.4) CONTINUE
CALL ENTRA (VU,AM2,TEMP,XW,CU,RT,XEL,XET,7,KCCDE,XJC)
XFCUT=XW*PJ+XJ
REQUI=RT*PJ
RT=PRCEQ
IF (IUSE.EQ.1) KCDF=0.
IF (XFL.LT.0. AND. ZJ.GE.(P*PJ)) KCDF=0.
IF (ZJ.GE.(3*PJ)) KCCDE=0.
F1=-P9.5428*CU*CU+33.7371CU-P.9148
IF (CU.GT.0.6339) F1=0.
IF (F1.GT.1.9*PJ)) KCDF=0.
IF (KCCDE.EQ.0) GC TO 40.
7P=PI*RT/2.
TH=2R
CONTINUE
IF (IUSE.EQ.1) KCDF=1.
IF (ISP.NE.1. AND KCODE.NE.1) Go To 50

50  AX=EL*PJ
      NJX=2.*PJ
      IF (FL.LT.0.) FL=0.
      IF (JX.LT.(2.*PJ) AND ZJ.GE.(1.*PJ)) FL=FL+(1.-FL)*(2.*PJ-JX)/0.
      IF (FL.GT.1.) FL=1.
      FACT=FL
      CDF=DE*FACT

60  CONTINUE
      DO 70 I=1,NX

70  M(I)=0
      CONTINUE

C *** TOTAL NUMBER OF SPANWISE SECTIONS*, AND THE NUMBER OF VORTEX
     STRIPS IN EACH SECTION PLUS 1 ***
     ZJ.X=2.*PJ
     IF (ZJ.LT.(1.*PJ)) FL=1.
     IF (FL.GT.1.) FL=1.
     FACT=FL
     CDF=DE*FACT

80  CONTINUE
      DO 70 I=1,NX

C *** THE NUMERICAL ORDER OF FLAP AND JET SPANS AMONG THE SPANWISE SECTIONS ***
      IF (ICAM.NE.1) Go To 110

C *** NUMBER OF CHORDWISE VORTEX ELEMENTS IN CHORDWISE SECTIONS, AND
     CAPPER CODE (=1) IF CAPPER ORDINATES ARE TO BE READ \n     =0 IF CAPPER FUNCTIONS ARE DEFINED BY CLOSED-FORM EXPRESSIONS MANUALLY
     IN SUBPROGRAMS 7CR(X) AND 7CT(X), AND THE NUMBER OF CAPPER ORDINATES TO BE READ
     ARBITRARY IF ICAM=0 ***

C *** NOTE. THE MAXIMUM NUMBER OF CAPPER ORDINATES ALLOWED IS 11 ***
      L=1
      IF (ICAM.NE.1) Go To 110

C *** IF ICAM=1, READ IN THE X-COORDINATES AND THE CAPPER ORDINATES,
     FIRST FOR THE ROOT SECTION AND THEN FOR THE TIP SECTION ***
      NW=NW(1)
      DO 100 J=1,2
      READ (5,570) (XI(I,J),I=1,IM)
      CONTINUE
**ORIGINAL PAGE IS OF POOR QUALITY**

READ (5,570) (7C(I,J),J=1,IM)
DO 80 J=1,IM
XFF(J)=XT(I,J)
RFF(J)=ZC(I,J)
CALL SPLINE (IM,XFF,RFF,AAF,PBF,CCF,DDF)
DO 90 J=1,IM
AAM(I,J)=AAF(J)
RBM(I,J)=RFF(J)
CCM(I,J)=CCF(J)
90 DDW(I,J)=DDF(J)
100 CONTINUE
110 CONTINUE
120 CONTINUE

*** COORDINATES OF PEEP HOPPS POOLING SPANWISESECTIONS ***

READ (5,570) ((XXL(I),XXT(I),YL(I),I=1,2),7S)
WRITE (6,570) ((XXL(I),XXT(I),YL(I),I=1,2),7S)
IF (USP.EQ.0.AND.KK.EQ.1) GO TO 210
IF (ISYW.EQ.0.AND.KK.EQ.1) GO TO 140
IF (KK.EQ.(NJW(NJP)+1)) 66 TO 150
IF (ISYM.EQ.0.AND.11) GO TO 160
IF (ISYM.EQ.0.AND.11) GO TO 170
IF (KK.EQ.(NJW(NJP)) GO TO 180
XXL(2)=XXL(1)+(XXL(2)-XXL(1))*(YL(2)-YL(1))/(YL(2)-YL(1))
XXT(2)=XXT(1)+(XXT(2)-XXT(1))*(YL(2)-YL(1))/(YL(2)-YL(1))
GO TO 170
YYL(1)=YL(1)
IF (ISYW.EQ.1.AND.11) GO TO 190
IF (ISYM.EQ.0.AND.11) GO TO 170

**END OF DOCUMENT**
GO TO 200
190 IF (KK EQ 1) YL(2) = YL(2) + RT - PJ
200 YL2 = YL(2)
210 CONTINUE
FM = M1(KK)
NSW = M1(KK)
DO 220 J = 1, NSW
   CJ = J
   CPSWL(J) = 0.5*(1. - COS((2.*CJ - 1.) * PI / (2.*FW))) * 100.
   YCC(J) = 0.5*(1. - COS(FJ * PI / FW))
   SJ(J, KK) = SIN(FJ * PI / FW)
220 CONTINUE
IF (KK .EQ. NC) GO TO 230
CPSWL(1) = 0.
CPSWL(NSW) = 100.
GO TO 240
230 CPSWL(1) = 0.
240 IF (KK .EQ. NJW(LL)) MJW1(LL, LL) = IPANEL
   IF (KK .EQ. NJW(NJP)) LC(L) = KL + 1
   LR = (L - 1) * NC + KK
   CALL PANEL(XYL, YXT, CPSWL, NSW, IPANEL, LPANEL, KL, LR, SWP, 7S)
   IPANEL = LPANEL + 1
   NCS = NCS + NSW - 1
   WIDTH(KK) = YL(2) - YL(1)
   BREAD(KK) = YL(1)
   IF (KK .EQ. NJW(LL)) MJW2(LL, LL) = LPANEL
   IF (KK .EQ. NC) GO TO 250
   CHORD(L) = XXT(2) - XXT(2)
   YCA(L) = XXT(2)
HALF = YL(2)
250 IF (KK .EQ. NJW(LL)) LL = LL + 1
   IF (L .EQ. 3) GO TO 300
   IF (L .EQ. 1) LPAN1 = LPANEL
   IF (L .EQ. 2) LPAN2 = LPANEL
   IF (NW(2) .EQ. 0) GO TO 260
   L = L + 1
   NCW = NW(L)
   IF (L .EQ. 3 .AND. NW(2) .EQ. 0) GO TO 290
   GO TO 170
260 DO 270 I = 2, 3
   DO 270 J = 1 + NFC
   MJW1(I, J) = 0
   MJW2(I, J) = 0
   LPAN2 = LPANEL
   NCS = NCS + 3
   GO TO 300
270 MJW1(I, J) = 0
280 DO 290 I = 1, NFC
   MJW1(3, J) = 0
   MJW2(3, J) = 0
290 GO TO 270
L=L-1
NCS=NCS+NCS/2
CONTINUE
NCS=NCS/3
NCW=NW(1)+NW(2)+NW(3)
VU=VMU
IF (IUSP.EQ.1) CU=VMU
VMU=CU
PTJ=RT
J=7J+Z5
IF (PT*RT*ARS(7J),AND,KCODE*FO,0) ZJT=RT*ARS(7J)+Z5
IF (IUSP.EQ.1) GO TO 310
AM2=AM1/(VMU*SQRT(TEMP))
IF (AM2.GT.0.9) WRITE (6,650) AM2
IF (AM2.GT.0.9) AM2=0.9
310 CONTINUE
LAST=LPAFNL

*** TOTAL NUMBER OF STREAMWISE JET SECTIONS, NUMBER OF JET CIRCUM-
FERENTIAL STRIPS MTAUS OF FOR A NON-CENTERED JET (USE CDD NUMBERS)
AND PLUS ONE FOR A CENTERED JET (USE EVF NUMBERS), AND NUMBERS
OF JET VORTICES ELSEWHERE ON EACH JET SECTION ***

PEAC (5,580) NNJ,NSJJ,(NCJ(I),I=1,NNJ)
WRITE (6,580) NNJ,NSJJ,(NCJ(I),I=1,NNJ)
IF (KCODE.EQ.0) CALL CIPCJ (ISYJ,NSJJ)
IF (ISYM.EQ.0) NSJJ=NSJJ/2
IF (ISYM.NE.0) NSJJ=(NSJJ+3)/2
NSYY=1-ISOY
NSH=NSJJ-1
FNP=NSJJ
CP retal(1)=0.
CP rel(NSJJ)=1.
YCMJ(1)=0.5*1.1-*COS(PI/FNJ))
DO 320 I=2,NSJJ
FI=T
CP rel(I)=0.5*1.1-*COS((2.*FI-I.1.*PI)/(2.*FNJ)))
320 YCMJ(1)=0.5*1.1-*COS((2.*FI-I.1.*PI)/(2.*FNJ)))
IF (FNJ=NC)
JC=NC
NJ=NNJ-1
EG 420 JJ=1,NNJ
IF (IUE.EQ.0) GO TO 700

*** COORDINATES OF ROUNING LIMITS OF JET SECTIONS PROJECTED ON X-Y
PLANE ***
READ (6,570) (XXL(I),XT(I),YI(I),I=1,2)
WRITE (6,570) (XXL(I),XT(I),YI(I),I=1,2)
IF (ISYW.EQ.0) GO TO 330
XL1=XXL(1)-(XXL(2)-XXL(1))*(RT*PTJ)/(YL(2)-YL(1))
XT1=XXT(1)-(XXT(2)-XXT(1))*(RT*PTJ)/(YL(2)-YL(1))

330 XL2=XXL(1)+(XXL(2)-XXL(1))*(RT*PTJ)/(YL(2)-YL(1))
XT2=XXT(1)+(XXT(2)-XXT(1))*(RT*PTJ)/(YL(2)-YL(1))
IF (ISYW.EQ.0) GO TO 340
XXL(1)=XL1
XT(1)=XT1

340 XXL(2)=XL2
XT(2)=XT2
IF (ISYW.EQ.0) GO TO 350
YL(1)=YL(1)-RT+PTJ

350 YL(2)=YL(2)+RT-PTJ
IF (KC0DE.EQ.0) GO TO 360
XXL(4)=XXL(2)
XXT(4)=XXT(2)
YL(4)=YL(2)

360 CONTINUE
GO TO 370
C ***COORDINATES CF PPFNK POINTS DEFINING PECTANGULAR JET SECTIONS FOR
C USE CONFIGURATIONS***
C
370 DO 390 I=1,4
READ (*) XXL(I),XXT(I),YL(I),7L(I)
390 WRITE (*) XXL(I),XXT(I),YL(I),7L(I)
CONTINUE
II=JJ
JJ1=JJ+L
FNCl=NCJ(JJ)
NJ=NCJ(JJ)
NJ=NPJ*16
IF (NJ.GT.6) NMJ=NJP
FNJ=NMJ
DO 400 J=1,NMJ
F=J
SC(J,JJ)=0.5*(1.0-COS((2.*F-1.)*PI/(5.*FNJ)))
400 ST(J,JJ)=SIN((2.*F-1.)*PI/(2.*FNJ))
DO 410 J=1,NMJ
FJ=J
CPCWL(J)=0.5*(1.-COS((2.*FJ-1.)*PI/(2.*FNCJ)))*GE03700
410 SN(J,JJ)=2.*SOPT(CPCWL(J)*(1.-CPCWL(J)))*GE03710
IF (KCODE.EQ.0) CALL JSHAPE (XXL,XXT,YL,YJ,ZJ,T,XCPCWL(IPANEL,NJ)*GE03720
1JC*ISYM)*GE03730
IF (KCODE.EQ.1) CALL REHAP (XXL,XXT,YL,ZL,CPCWL,CPSWL,IPANEL,NJ)*GE03740
1C*II}*NSYM)*GE03750
MJ(JJ)=LAST*GE03760
420 TPAFL=LAST+1
SDF=XXT(1)-XXL(1)*GE03770
IF (TUSP.EQ.1) TH=ZL(3)-ZL(4)*GE03780
YCCM(25)=ZL(4)-ZCP(1)*GE03790
YCCM(24)=USB*GE03800
C(I)=CVU*GE03810
IF (KCODE.EQ.0) YCCM(25)=1.*GE03820
IF (KCODE.EQ.1) CALL RECTJ (ISY,NCJ,Y)*GE03830
JPANEL=LAST-LPAFL*GE03840
LTCTAL=LAST-IPANEL*GE03850
C ***NUMBER OF SECTIONS IN WHICH THE DIHEDRAL IS TO BE DEFINED.*** GE03860
C DIHEDRAL IN DEG., AND THE CURTISAPI.Y COORDINATE OF THE SECTION.* GE03870
C * MDG=1 IF THERE IS DIHEDRAL, =0, OTHERWISE.* GE03880
C C READ (5,580) NDG,WDG*GE03890
C WRITE (6,590) NDG,MDG*GE03900
C READ (5,570) (SA(I),Y(T(I)),I=1,NDG)*GE03910
C WRITE (6,570) (SA(I),Y(T(I)),I=1,NDG)*GE03920
C DO 430 I=1,NDG*GE03930
430 SNC(I)=SIN(SNG(I)*PI/180.)*GE03940
LWF=LPANFL*GE03950
LWFJ=LTCTAL*GE03960
NTL=0*GE03970
KW=0*GE03980
WN=0.*GE03990
RN=0.*GE04000
C ***KF=1 IF THE FUSELAGE IS PRESENT, =0 OTHERWISE. NT=NUMBER OF* GE04010
C FOLLIPER TERMS EXCLUDING THE ZPZ-CPDFR TANK. NCUM=NUMBER OF CIR- GE04020
C CURRERENTIAL LOCATIONS AT WHICH PRESSURE LOADING IS TO BE COMPUTEDGE04030
C * NF=NUMBER OF CONTROL STATION* AONG THE FUSELAGE AXIS *FE.** GE04040
C * NK=NUMBER OF SEGMENTS INTO WHICH THE FUSELAGE AXIS IS DIVIDED,* GE04050
C * NKF=NUMBER OF SINGULARITY ELEMENTS IN EACH SEGMENT.* GE04060
C * FOR MIDWING CONFIGURATION USE EVEN NUMBERS FOR NCUM.* GE04070
C C DO 440 I=1,KF*GE04080
440 XAS(I)=0.*GE04090
XAS(6)=0.*GE04100
READ (*,590) KF,NT,NCUM,NF,KW,(NKF(I),I=1,KW)GE04110
C
WRITE (*,580) (XAS(I),I=1,KW1),FUSIND,FUSNO,X1,XJF  
IF (IFR.EQ.0) GO TO 450
READ (*,570) (XFF(I),I=1,IFN)
WRITE (*,570) (PFF(I),I=1,IFN)
CALL SPLINF (IFN,XFF,RFF,ADF,PFF,CCF,DDF)
CONTINUE
XLEF=XAS(1)
XTEF=XAS(KW1)
IF (YN(2,1).LE.0.01) GO TO 480
IF (ZCP(2).GE.0.0) TH1=PI/2.-ATAN(ZCP(2)/YN(2,1))
IF (ZCP(2).LT.0.) TH1=PI/2.+ATAN(ABS(ZCP(2))/YN(2,1))
IF (ZCP(2).LT.0.) GO TO 460
 IF (APS(ZCP(2)).LE.0.001) GO TO 470
 F1=TH1/PI*FLCAT(NCUW)
 NM1=F1
 IF (NM1.LT.2) NM1=2
 GO TO 490
 TH2=PI-TH1
 F2=TH2/PI*FLCAT(NCUW)
 NH2=F2
 IF (NH2.LT.2) NH2=2
 NH1=NCUM-NH2
 GO TO 490
 NM1=NCUM/2
 GO TO 490
490 CONTINU

500 CONTINU

510 CONTINU

520 CONTINU

530 CONTINU

540 CONTINU

550 CONTINU
\[ P_{\text{HT}} = \pi / 2 - \arctan(F) \]

\[ N_{\text{J}1} = N_{\text{JH}} - 1 \]

\[ N_{\text{J}2} = N_{\text{JH}} + 1 \]

\[ Y(3,2) = \sin(\pi) \]

\[ Y(4,3) = -\cos(\pi) \]

\[ Y(3,N_{\text{J}1}) = Y(3,2) \]

\[ Y(4,N_{\text{J}1}) = -Y(4,2) \]

\[ Y(3,N_{\text{J}2}) = Y(3,2) \]

\[ Y(4,N_{\text{J}2}) = Y(4,2) \]

\[ Y(3,N_{\text{J}1}) = -Y(3,2) \]

\[ Y(4,N_{\text{J}1}) = -Y(4,2) \]

\[ \text{GO TO 540} \]

\[ \text{FN} = N_{\text{J}} / 2 \]

\[ N_{\text{J}1} = N_{\text{J}} / 2 \]

\[ N_{\text{J}2} = N_{\text{J}} - 2 \]

\[ Y(3,N_{\text{J}1}) = \sin(\pi) \]

\[ Y(4,N_{\text{J}1}) = \cos(\pi) \]

\[ Y(3,N_{\text{J}2}) = -Y(3,N_{\text{J}1}) \]

\[ Y(4,N_{\text{J}2}) = -Y(4,N_{\text{J}1}) \]

\[ \text{GO TO 530} \]

\[ \text{NJ} = N_{\text{J}} \]

\[ N_{\text{J}1} = N_{\text{J}} - 1 \]

\[ N_{\text{J}2} = N_{\text{J}} - 2 \]

\[ Y(3,N_{\text{J}1}) = \sin(\pi) \]

\[ Y(4,N_{\text{J}1}) = \cos(\pi) \]

\[ Y(3,N_{\text{J}2}) = Y(3,N_{\text{J}1}) \]

\[ Y(4,N_{\text{J}2}) = Y(4,N_{\text{J}1}) \]

\[ \text{CONTINUE} \]

\[ \text{FN} = N_{\text{J}} \]

\[ N_{\text{J}1} = N_{\text{J}} - 1 \]

\[ N_{\text{J}2} = N_{\text{J}} - 2 \]

\[ Y(3,N_{\text{J}1}) = \sin(\pi) \]

\[ Y(4,N_{\text{J}1}) = \cos(\pi) \]

\[ Y(3,N_{\text{J}2}) = Y(3,N_{\text{J}1}) \]

\[ Y(4,N_{\text{J}2}) = Y(4,N_{\text{J}1}) \]

\[ \text{GO TO 550} \]

\[ \text{PC}(J) = \sin(\pi / N_{\text{J}}) \]

\[ \text{PETA} = \text{GRAT}(\pi / \text{AM}1) \]

\[ \text{PETA} = \text{GRAT}(\pi - 2 \times \text{AM}2) \]

\[ R1 = \text{PETA} \times \text{AM}1 \]

\[ R2 = \text{PETA} \times \text{AM}2 \]

\[ \text{XLL}(K) = \text{ALP} + (\text{TWIST} \times \text{YLE}(K) / \text{HALF}) \times \pi / 10. \]

\[ T = \text{XLL}(K) \]

\[ \text{XTT}(K) = \sin(T) / \text{CGS}(T) \]

\[ \text{Y(6)} = \text{X1} \]

\[ 7J = 2J + 2S \]

\[ \text{RETURN} \]

\[ \text{C} \]

\[ \text{FORMAT}(8(F10.5)) \]

\[ \text{FORMAT}(8(F10.5)) \]

\[ \text{FORMAT}(10X,F10.5,F10.5) \]

\[ \text{FORMAT}(6(F10.5)) \]

\[ \text{FORMAT}(2(6X*14)*7F10.5) \]
IHIT HAS BEEN SET TO 0.9 IN THE COMPUTATION.

THE EQUIVALENT JET NUMBER IS, F10.5, 4

THE EQUIVALENT JET PROPERTIES ARE EVALUATED AT, F10.5.

THE EQUIVALENT JET RADIUS IS, F10.5.

THE VELOCITY RATIO OF THE EQUIVALENT JET, V0/VJ, IS, F10.5.

CIRCULAR JET IS USED FOR/20X, 23H INTEGRATION COMPUTATION.

RECTANGULAR JET WITH LATERAL EXTENT EQUAL/20X, 23H INTEGRATION COMPUTATION.

CHECK WHETHER THE WING IS IMMERSED IN THE JET.
TP=0.

CONTINUE

TA=(2.*FK-1.*PP/(2.*FCUM)+TP

CSF(I,K)=COS(FI*TA)

IK=0

FNF=NKF(I)

X0=XAS(1)

N2=1

N1=NKF(I)

SL=XAS(2)-XAS(1)

DO 40 I=1,NF

M=I-TK

FI=M

XF(I)=X0+0.5*SL*(1.+COS((2.*FI-1.*PI)/(2.*FNF)))

XCF(I)=X0+0.5*SL*(1.+COS(FI*PI/FNF))

SNP(N2,M)=SIN((2.*FI-1.*PI)/(2.*FNF))

XC=XCF(I)

RF(I)=FUP(XC)

IF (I.EQ.N1) GO TO 40

N2=N2+1

IK=N1

N1=1+NKF(N2)

SL=XAS(N2)-XAS(1)

FNF=NKF(N2)

X=NAS(N2)

CONTINUE

RETURN

SUBROUTINE SPLINE (N,X,Y,A,B,C,D)

DIMENSION S(11), T(21), CA(21)

DIMENSION A(1), P(1), C(1), D(1), X(1), Y(1)

N1=N+1

N1=N-1

H(N1)=0.

H(1)=X(3)-X(2)

H(2)=X(3)-X(1)

H(3)=X(2)-X(1)

DO 10 K=4,N

H(K)=0.

DO 20 K=1,N

S(K)=-H(K+1)/H(1)

N1=N-1

DO 70 I=2,N

IF (I.EQ.N) GO TO 30

H(N1)=-6.*((Y(I+1)-Y(I))/Y(I+1)-X(I))-Y(I-Y(I-1))/(X(I)-X(I-1))

1)

GO TO 40

H(N1)=0.

DO 60 J=1,N

END
$H(J)=0,$

IF (I,EQ.,N) GO TO 50
IF (J,LT.(I-1).OR.J,GT.(I+1)) GO TO 60
$H(I-1)=X(I)-X(I-1)$
$H(I)=2.*(X(I+1)-X(I-1))$
$H(I+1)=X(I+1)-X(I)$
GO TO 60

50 $H(N-2)=X(N)-X(N-1)$
$H(N-1)=-X(N)+X(N-2)$
$H(N)=X(N+1)-X(N)$
CONTINUE

II=1
CALL VMSEQN (NJ,II,P,S,C)
NJ=N-1
CONTINUE

DO 80 I=1,N
$A(I)=(S(I+1)-S(I))/(X(I+1)-X(I))$
$R(I)=S(I)/2.$
$C(I)=(Y(I)-Y(I))/X(I+1)-X(I)=2.*S(I)+S(I+1))/6.$
$D(I)=Y(I)$
RETURN

FNC

SUBROUTINE RSHAP (XXL,XXT,YL,7L,CPCWL,CPWSL,IPANEL,NJ,JC,JNSYM)
TO DEFINE THE LOCATIONS OF VORTEX AND CONTROL POINTS ON RECT. JETS

DOF 10 IS=1,4
IF (NSYM.EQ.0) $NSJ=(NSJ+1)/2$
IF (NSYM.EQ.0) $NSJ=NSJ/2$
NSJ=JSJ
DO 10 J=1,NJ
FJ=J
NJ=NJ

10 PSI(J)=0.5*(1.-COS(FJ*PI/FNJ))
DO 170 IS=1,4
IF (IS.EQ.0) AND (IS.EQ.1) GO TO 170
IF (IS.EQ.4) GO TO 20
K1=IS
K2=IS+1
GO TO 30

20 K1=1
K2=4
30 CONTINUE
SPAN=YL(K2)-YL(K1)
XDIFF=XXL(K2)-XXL(K1)
DO 40 I=1,2
II=I+K1-1
IF (IS.EQ.4.AND.I.EQ.2) II=4
C(I)=XXT(II)-XXL(II)
DO 40 J=1,NJ
40 XL(I+J)=XXL(II)+CPCWL(J)*C(I)
TF (ABS(SPAN).LE.0.001) GO TO 70
DO 50 J=1,NJ
50 SLOPE(J)=(XL(2,J)-XL(1,J))/SPAN
DO 60 K=1,NSJJ
60 YK=CPSWL(K)*SPAN
DO 60 J=1,NJ
Y(J,K)=YK+YL(K)
X(J,K)=XL(I,J)+SLOPE(J)*(Y(J,K)-YL(K1))
60 CONTINUE
NS=NSJ1
70 IF (ABS(SPAN).LE.0.001) NS=1
DO 160 K=1,NS
YC=YCON(K)
IF (ABS(SPAN).LE.0.001) YC=0.5
KK=JC,K
CH(KK)=C(1)-(C(I)-C(2))OyC
IF (ABS(SPAN).LE.0.001) GO TO 80
YC1=CPSWL(K)
YC2=CPSWL(K+1)
GO TO 90
80 YC1=0.
YC2=1.
90 CONTINUE
FX(KK,1)=XXL(K1)*XDIFF*YC1
EX(KK+2)=XXL(K1)*XDIFF*YC2
TX(KK,1)=XXT(K1) +(XXT(K2)-XXT(K1))*YC1
TX(KK+2)=XXT(K1) +(XXT(K2)-XXT(K1))*YC2
DO 140 J=1,NJ
NPANEL=(K-I)*KJ+1*IPANEL
140 CONTINUE
DO 130 I=1,2
K11=K+I-1
IF (ABS(SPAN).LE.0.001) GO TO 100
X1=X(J+K11)
Y1=Y(J+K11)
100 IZA=K1
IF (I.EQ.2) I7=K2
XI=XL(I+J)
YI=YL(K1)
IF (J.NE.1) GO TO 110
ZZ=ZL(IZN)
XX=XXL(IZN)
GO TO 120
110
ZZ=ZN(NPANEL,N)
XX=XN(NPANEL,N)
CONTINUE
GO TO 120
XN(NPANEL,N)=X1
YN(NPANEL,N)=Y1
ZLN(PANEL,N)=Z7
CONTINUE
ZC=ZN(NPANEL,N)+ZLN(PANEL,N)*ZCP(NPANEL,-YN(NPANEL,N))
150
111
CONTINUE
IPANEL(IPANEL,1)=XN
CONTINUE
PANEL (XXLYL,XXTCPCWLCPSWL,NPANEL,IPANEL,LPANEL,L,KL,SPNL PI2)
COMMON /SCHEME/ X(10,41), Y(10,41), SLOPE(15), XL(2,15), XTT 41), PPNL 60
DIMENSION SWP(3,5), X(10,41), Y(10,41), SLOPE(15), XL(2,15), XTI 41)
COMMON /SCHEME/ X(2), X(10,41), Y(10,41), SLOPE(15), XL(2,15), XTT 41)
COMMON /SCHEME/ X(2), X(10,41), Y(10,41), SLOPE(15), XL(2,15), XTT 41)
COMMON /SCHEME/ X(2), X(10,41), Y(10,41), SLOPE(15), XL(2,15), XTT 41)
COMMON /SCHEME/ X(2), X(10,41), Y(10,41), SLOPE(15), XL(2,15), XTT 41)
COMMON /SCHEME/ X(2), X(10,41), Y(10,41), SLOPE(15), XL(2,15), XTT 41)
COMMON /SCHEME/ X(2), X(10,41), Y(10,41), SLOPE(15), XL(2,15), XTT 41)
COMMON /SCHEME/ X(2), X(10,41), Y(10,41), SLOPE(15), XL(2,15), XTT 41)
COMMON /SCHEME/ X(2), X(10,41), Y(10,41), SLOPE(15), XL(2,15), XTT 41)
CONTINUE
RETURN
END
DO 10 J=1,NCW
10 XL(I,J)=XL(I)+CPCWL(J)*C(I)/100.
SPAN=YL(2)+YL(1)
DO 20 J=1,NCW
20 PSI(J)=0.5*(1.+COS(FLOAT(J)*PI/FLCAT(NCW)))
SLOPE(J)=(XL(2,J)-XL(1,J))/SPAN
SMP(J,LR)=ATAN(SLOPE(J))
DO 20 K=1,NSW
YK=CPSWL(K)*SPAN/100.
DO 30 J=1,NCW
Y(J,K)=YK+YL(1)
X(J,K)=XL(1,J)+SLOPE(J)*C(Y(J,K)-YL(1))
PSItJ)=0.5*(I.-COS(FLOAT(J)*PI/FLOAT(NCW)))
SLOPE(J)S=XL(2,J)-XL(1,J))/SPAN
CONTINUE
Y(J,K)=YK+YL(1)
X(J,K)=XL(1,J)+SLOPE(J)*C(Y(J,K)-YL(1))
DO 40 I=2,NSW
DO 30 J=1,NCW
Y(J,K)=YK+YL(1)
X(J,K)=XL(1,J)+SLOPE(J)*C(Y(J,K)-YL(1))
PSItJ)=0.5*(I.-COS(FLOAT(J)*PI/FLOAT(NCW)))
SLOPE(J)S=XL(2,J)-XL(1,J))/SPAN
CONTINUE
XLE(KK)=XLL(K)+(XLL(K+I)-XLL(K))*(YLE(KK)-Y(I,K))/(Y(I,K+1)-Y(I,K))
XTE(KK)=XTT(K)+(XTT(K+I)-XTT(K))*(YLE(KK)-Y(I,K))/(Y(I,K+1)-Y(I,K))
CH(KK)=XTE(KK)-XLE(KK)
FX(KK,1)=XXL(1)+(XXL(2)-XXL(1))*CPSWL(K)/100.
EX(KK,2)=XXL(1)+(XXL(2)-XXL(1))*CPSWL(K+1)/100.
TX(KK,1)=XTT(1)+(XTT(2)-XTT(1))*CPSWL(K)/100.
TX(KK,2)=XTT(1)+(XTT(2)-XTT(1))*CPSWL(K+1)/100.
TANG=(XXL(2)-XXL(1))/SPAN
SWEEP(KK)=ATAN(TANG)
DO 60 J=1,NCW
NPANEL=(K-I)*hCW*J-1+IPANEL
DO 50 I=1,2
KI1=K-I-1
XNJ(PANEL+I)=X(I,KI1)
YNJ(PANEL+I)=Y(I,KI1)
ZNJ(PANEL+I)=ZS
CONTINUE
XCP(NPANEL)=XLE(KK)+PSI(J)*CP(KK)
YCP(NPANEL)=YLE(KK)
ZCP(NPANEL)=ZS
XP(NPANEL)=XLE(KK)+CPCWL(J)*CH(KK)/100.
YP(NPANEL)=YLE(KK)
CONTINUE
LPANEL=NPANEL
RETURN
END
SUBROUTINE ENTRN (UAMJ, T, XM, CMU, PT, XEL, XET, Z, KCODE, XJC)

C TO COMPUTE THE JET ENTRAINMENT FUNCTION

DIMENSION CSJ(70), SSJ(70)
DIMENSION PU1(31), PU2(31), FU1(31), FU2(31), FU3(31), RR2(31)
COMMON /JET/ PK1, XC, X(31), A(31), B(31)

WRITE (6, 260)  
WRITE (6, 270)  
PI=3.14159265
IK=1
PKI=0.018503, 0.11*U
KCCCF=0
XMID=0.5*(XEL+XET)
XM=XMID
XO=0.
RO=1.
F=2*PK1*SQRT((1.-U)*RFJ)
XC=0.35/F
XJC=XC
PU=1-U
UA=(1.+2.*U/(1.-U))/(1.5+U/(1.-U))
X(1)=XC
IDX=IDX
DXX=IDX
IF (DXX.GT.1.) GO TO 10
IF (DXX.LT.1.) AND (DXX.LE.3.) DXX=2.5
END

CONTINUE
X(?)=X(1)+DXX/P.
DO 20 I=2,30
X(I+1)=X(I)+DXX
DO 30 I=1,70
FI=I
CSJ(I)=COS((2.*FI-1.)*PI/140.)
SSJ(I)=SIN((2.*FI-1.)*PI/140.)
DO 160 I=1,31
IF (U.LE.0.01) GO TO 80
IF (I.EQ.1) S=(2.*PK1*SQRT(RFJ*(1.-U))*XC/0.72-0.35)*SORT((1.-U)/U)
END

1=ALOG(1A))
IF (I.EQ.2) S=PSX*(X(2)-XC)
IF (I.EQ.2) S=SH+DXS*DXX
M=1
IF (I.EQ.1) M=2
CONTINUE

SUM=0.
DO 50 J=1,70
SR=0.5*S*(1.-CSJ(J))
AP1=(1.-U)*(1.-EXP(-1./(2.*SR)))
AG=ALOG((1.+2.*U/AP1)/(1.+U/AP1))
SUM=SUM+(1./SQRT(AP1*AG)-SQRT(2.*SR/((1.-U)*0.65314718)))
RES=SUM*PI/70.*0.5*SQRT(2.*SR/((1.-U)))*S**1.5/1.0397208
X1=RES+0.35
IF (M_NE.1) GO TO 70
XT=X1/(2.*PK1*SQRT((1.-U)*REJ))
P1=(1.-U)*(1.-EXP(-1./(2.*S)))
G1=ALOG((1.+2.*U/P1)/(1.+U/P1))
DSX=2.*PK1*SQRT(REJ*(1.-U)*PK1/AK1/U)
S=0.5
IF (ABS(X(I)-XT).LE.0.01) GO TO 60
DX=X(I)-XT
S=S+DX*DSX
SH=S
GO TO 40
60
P1=(1.-U)*(1.-EXP(-1./(2.*SH)))
70 IF (ABS(T-1.).LF.0.01) GO TO 100
XH=X1*0.72/(2.*PK1*SQRT((1.-U)*REJ))
AK2=(1.-U)*(1.-EXP(-1./(2.*S)))
AG2=ALOG((1.+2.*U/AK2)/(1.+U/AK2))
DSX1=2.*PK1*0.72*SQRT(REJ*(1.-U)*AK2*AG2/U)
DX=X(I)-XH
S=S+DX*DSX1
M=M+1
GO TO 40
80
IF (I_NE.1) S=2.*PK1*SQRT(REJ)*X(I)-0.35
IF (I_NE.1) P1=(1.-U)*(1.-EXP(-1./(2.*SH)))
DSX=2.*PK1*SQRT(REJ)
IF (APS(T-1.).LF.0.01) GO TO 100
S=2.*PK1*0.72*SQRT(REJ)*X(I)-0.35
90 IF (I_NE.1) AND(U.LE.0.01) DSX=2.*PK1*SQRT(REJ*ALOG(UA)/UA)*(1.-U)
M0=1.-EXP(-1./(2.*S))
MOP=2.*M0**2/0.72
P1P=2.*PK1*/(1.-U)
P2P=(T-1.+0.2*2*(1.-U)*AMJOAMJE*T)*M0-0.2*P1*AMJOAMJE*T*(P1+2.*U)
P2FP=(T-1.+0.2*2*(1.-U)*AMJOAMJE*T)*MOP-0.2*P1*AMJOAMJE*T*(P1+2.*U)
P3P=2.*PK1/(1.-U)
P4P=2.*PK1*/(1.-U)
P5P=-2.*P2P/(1.-U)
P6P=2.*PK1*(1.-U)*AMJOAMJE*T)
F1P=-P2P*0.8970*(0.08901-0.04005*F2+0.01792*P2**2-0.00640*F2*P2**3)/(F2-1.05001*P2)
F2P=-P2P*0.7935*(0.0527-0.0286*F2+0.01478*P2**2-0.00599*P2**3)/(F2-1.05001*P2)
F3P=-P2P*0.1257*(0.04653*F2-0.01202*P2**2-0.00599*P2**3)/(1.+1.02*Y)
F4P=-P2P*0.1257*(0.04653*F2-0.01202*P2**2-0.00599*P2**3)/(1.+1.02*Y)
GOTO 110
100 P2=0
P2P=0.
F1P=0.
F2F=0.
F3F=0.
IF (I.EQ.1) AND (X(I).GT.0.01) DSX=2.*P1*SQRT(REJ*ALOG(UA)/U)*(1.-U)
P1F=2.*P1*P1/(1.-U)
F1=0.8907*(0.12P5+7.01617+P2-0.00607*P2**2+0.00192*P2**3)/(1.+0.8)
11817*P2)
F2=0.79335*(0.06676+0.00453*P2-0.00204*P2**2+0.00075*P2**3)/(1.+0.8)
185716*P2)
F3=(0.21429+0.04061*P2-0.01249*P2**2+0.00351*P2**3)/(1.+0.78948*P2)

1)
FU=U*P1*F1+P1*P1*F2
DMC1=(P1F*F1+P1*F1P-U*P2P*F3-U*F2/3P)/FU
DMC2=(P1F*F1-U*P2P*F3)*(U*P1*F1+U*P1*F1P+2.*P1*P1F2+P1*P1*F2P)/FU

1)
DMX=2.*(1.-U)*(DMC1=DMC2)*DSX/SQRT(REJ)
RJ2=0.5*(1.-U)/FL
RJ1=SORT(RJ2)
WRITE (6,250) X(I),RJ1,DMX
IF (Z.LT.0) GO TO 140
IF (IK.LT.1) GO TO 140
IF (X(I).GE.XEL) GO TO 120
GO TO 140

120 IF (P1,LT.Z) GO TO 140
XM1=X0+(Z-R0)/(X(I)-X0)/(RJ1-RN)
IF (XEL.LT.0) GO TO 130
IF (XM1,L.T.XEL) KCODE=1
IK=IK+1
GO TO 140

130 XM=0.5*XET
IF (XM,J.LE.XET) KCODE=1
IK=IK+1
CONTINUE
R=R/R1
X=X(I)
PU1(I)=P1
PU2(I)=P2
FU1(I)=F1
FU2(I)=F2
FU3(I)=F3
RR2(I)=RJ2
IF (I.EQ.1) GO TO 150
R(I)=(DMX-DMXO)/(X(I+1)-X(I))
A(I)=DMXC-R(I)*X(I)
GO TO 160

150 A(I)=0.145*DMX/0.32
B(I)=(DMX-A(I))/X
160 DMXC=DMX
K=I
170 IF (K.GT.30) GO TO 240
IF (XM.GE.0..AND.XM.LT.XC) GO TO 180
IF (XM.GE.X(K).AND.XM.LT.X(K+1)) GO TO 180
K=K+1
GO TO 170
180
F11=RR2(K) * (PU1(K) * U*FU1(K) + PU1(K) + 2*FU2(K) ) / (U*U)
F12=RR2(K+1) * (PU1(K+1) * U*FU1(K+1) + PU1(K+1) + 2*FU2(K+1) ) / (U*U)
F21=RR2(K) * (PU1(K) * U*FU1(K) - U*PU2(K) * FU3(K) ) / U
F22=RR2(K+1) * (PU1(K+1) * U*FU1(K+1) - U*PU2(K+1) * FU3(K+1) ) / U
IF (ABS(T-1.) LE 0.001) GO TO 190
F31=RR2(K) *(9.5*PU1(K) / 70. - PU1(K) * FU1(K) + U*PU2(K) * FU3(K) ) / U
F32=RR2(K+1) *(9.5*PU1(K+1) / 70. - PU1(K+1) * FU1(K+1) + U*PU2(K+1) * FU3(K+1) ) / U
GO TO 200
190
X11=F11 / (F21 + F31)
X12=F12 / (F22 + F32)
GO TO 200
200
CONTINUE
X1=X(K)
X2=X(K+1)
X21=F11 / (F21 + F31) + F31 * (F11 / (F21 + F31) - 1.) / F21
X22=F12 / (F22 + F32) + F32 * (F12 / (F22 + F32) - 1.) / F22
X31=2.0*F21 * (F11 + F31) / (X21 + F21 - F31)
X32=2.0*F22 * (F12 + F32) / (X22 + F22 - F32)
IF (X1.LT.X(K)) GO TO 210
GO TO 220
210
X1=0.
X2=X(K)
X22=X21
X32=X31
X21=1./U
X31=1.
IF (ABS(T-1.) .LE. 0.001) GO TO 220
X12=X11
X11=1. / (T*U)
CMU=X21 * (XM-X1) * (X22-X21) / (X2-X1)
RT=X31 * (XM-X1) * (X32-X31) / (X2-X1)
CMU=1. / CMU
IF (ABS(T-1.) .LE. 0.001) GO TO 230
RU=X11 * (XM-X1) * (X12-X11) / (X2-X1)
T=1. / (CMU + RU)
230
CONTINUE
240
RETURN
250 FORMAT (8F10.5)
260 FORMAT (*/5X,43=THE COMPUTED JET ENTRAINMENT ARE AS FOLLOWS)
SUBROUTINE RECTJ (ISYM, NSJ, Y)
C TO DEFINE THE UNIT NORMAL VECTORS TO THE SURFACE OF RECTANGULAR
C JETS
DIMENSION Y(10*41)
IF (ISYM.EQ.0) GO TO 10
NSJ1=NSJ+1
NJH=(NSJ-1)/2+2
GO TO 20
10 NSJ1=NSJ-1
NJH=NSJ/2
DO 50 I=1,NSJ1
IF (I.EQ.1.AND.ISYM.NE.0) GO TO 30
IF (I.EQ.NJH) GO TO 40
Y(3,I)=1.
Y(4,I)=0.
GO TO 50
30 Y(3,I)=0.
Y(4,I)=-1.
GO TO 50
40 Y(3,I)=0.
Y(4,I)=1.
GO TO 50
50 CONTINUE
RETURN
END

SUBROUTINE CIRCJ (ISYM,NSJ,Y)
C TO DEFINE THE UNIT NORMAL VECTORS TO THE SURFACE OF CIRCULAR JETS
DIMENSION Y(10*41)
PI=3.14159265
IF (ISYM.EQ.0) GO TO 10
NSJ1=NSJ+1
NN=(NSJ-1)/2+1
FN2=NN
NJH=NN+1
Y(1*1)=-SIN(PI/(2.*FN2))
Y(2*1)=-COS(PI/(2.*FN2))
GO TO 20
10 Y(1*1)=1.
Y(2*1)=0.
NSJ1=NSJ-1
FN2=NSJ/2
NJH=NSJ/2
DO 50 I=1,NSJ1
K=I
K1=I
IF (I.GT.NJH.AND.ISYM.EQ.0) K=I-NJH+1
IF (I.GT.NJH.AND.ISYM.EQ.0) K=I-NJH
GO TO 50
50 CONTINUE
FI=K
IF (ISYM.NE.0) ANG2=(FI-1.)*PI/FN2
IF (ISYM.EQ.0) ANG2=FI*PT/FN2
YP=0.5*(1.-COS(ANG2))
IF (ANG1.GT.PI) YP=-YP
IF (ISYM.EQ.0) ANG1=PI-ATAN SQRT(1.-YP*YP)/YP)
IF (I.GT.NJH) KK=II-NJ-
IF (I.LE.NJH.AND.ISYM.EQ.0) FII=K'
ANG1=(2.*FII-1.)*PI/(2.*FN2)
YP=0.5*(1.-COS(ANG1))
IF (ANG1.GT.PI) YP=-YP
IF (ISYM.EQ.0) ANG1=PI-ATAN SQRT(1.-YP*YP)/YP)
IF (I.GT.NJH) GC TC 30
GO TO 40

IF (I.GT.NJH) KK=II-NJ-
IF (I.LE.NJH.AND.ISYM.EQ.0) FII=K'
ANG1=(2.*FII-1.)*PI/(2.*FN2)
YP=0.5*(1.-COS(ANG1))
IF (ANG1.GT.PI) YP=-YP
IF (I.GT.NJH) GC TC 30
GO TO 40

SUPROUINE JSHAPE (XXL*XXT*YL*YJ*7J*RJ*CPCWL*IF PANEL*NJ*JC*ISYM) JSP
TO DEFINE THE LOCATIONS OF VORTEX AND CONTROL FCIATS ON CIRCULAR
JETS
COMMON /SCHFRE/ C(2)*X(10,41)*Y(10,41)*SLOPE(15)*XL(2,15)*XTT(41)*JSP
50

END

C JETS
COMMON /SCHFRE/ C(2)*X(10,41)*Y(10,41)*SLOPE(15)*XL(2,15)*XTT(41)*JSP
50

END

C JETS
COMMON /SCHFRE/ C(2)*X(10,41)*Y(10,41)*SLOPE(15)*XL(2,15)*XTT(41)*JSP
50

END

C JETS
COMMON /SCHFRE/ C(2)*X(10,41)*Y(10,41)*SLOPE(15)*XL(2,15)*XTT(41)*JSP
50

END
10 XL(I,J)=XXL(I)*CPCWL(J)*C(I)  JSP 230
DO 20 J=1,NJ  JSP 240
FJ=J  JSP 250
FNCJ=NJ  JSP 260
PSI(J)=0.5*(1.-COS(FJ*PI/FNCJ))  JSP 270
20 SLOPE(J)=(XL(2+J)-XL(1+J))/(2.*RJ)  JSP 280
DO 30 K=1,N2  JSP 290
YY=Y(2*K)  JSP 300
IF (K.EQ.*N12-1).OR.(K.EQ.N12) YY=1.  JSP 310
IF (K.EQ.N2) YY=-1.  JSP 320
XTT(K)=YJ*RY#YY  JSP 330
30 X(J,K)=XL(1+J)*SLOPE(J)*(XTT(K)-YL(1))  JSP 340
DO 120 K=1,N1  JSP 350
KK=JC*K  JSP 360
L=K  JSP 370
IF (K.EQ.N12) L=1  JSP 380
EX(KK,1)=(XXL(1)+(XXL(2)-XXL(1))*(XTT(L)-YL(1)))/(2.*RJ)  JSP 390
EX(KK,2)=(XXL(1)+(XXL(2)-XXL(1))*(XTT(L)-YL(1)))/(2.*RJ)  JSP 400
TX(KK,1)=(XTT(1)+(XTT(2)-XTT(1))*(XTT(L)-YL(1)))/(2.*RJ)  JSP 410
TX(KK,2)=(XTT(1)+(XTT(2)-XTT(1))*(XTT(L)-YL(1)))/(2.*RJ)  JSP 420
CH(KK)=C(1)-(C(1)-C(2))*0.5*(1.+Y(4*K))  JSP 430
DO 120 J=1,NJ  JSP 440
NPAFL=(K-1)*KJ+NJ  JSP 450
DO 90 I=1,?  JSP 460
KI1=K*I+1  JSP 470
SIGN=-1.  JSP 480
IF (K.EQ.N12.0.RD.1.EQ.1) KI1=1  JSP 490
IF (ISYW.EQ.0) GO TO 40  JSP 500
IF (KI1.EQ.N1.0.RD.KI1.EQ.2) GO TO 60  JSP 510
GO TO 50  JSP 520
50 CONTINUE  JSP 530
IF (KI1.EQ.(N12-1).0.RD.KI1.EQ.N12) GO TO 70  JSP 540
IF (KI1.EQ.N2) GO TO 70  JSP 550
YY=Y(2*KI1)  JSP 560
ZZ=Y(1+KI1)*SIGN  JSP 570
GO TO 60  JSP 580
60 YY=-1.  JSP 590
ZZ=-Y(1+KI1)/Y(2+KI1)  JSP 600
GO TO 70  JSP 610
70 YY=1.  JSP 620
ZZ=Y(1+KI1)/Y(2+KI1)  JSP 630
GO TO 80  JSP 640
80 CONTINUE  JSP 650
ZN(KPANEL+1)=X(J+KI1)  JSP 660
YN(KPANEL+1)=YJ*RY#YY  JSP 670
90 CONTINUE  JSP 680
YN(KPANEL+1)=ZJ*RY#ZZ  JSP 690
YP=0.5*(1.+Y(4*K))  JSP 700
JSP 710
IF (ISYM.EQ.0) YK=2.*YK-1.

IF (ARS(YN(NPANEL,2)-YN(NPANEL,1)).LE.0.0001) CC

ZCP(NPANEL)=YN(NPANEL1)+(YN(NPANEL,2)-YN(NPANEL,1))*(YCP(NPANEL)-YK)

CONTINUE

ZCP(NPANEL)=Z

CONTINUE

XCP(NPANEL)=XXL(1)+(XXL(2)-XXL(1))*YK*PSI(J)*CFtKK)

JSP 730

IF (ISYN.EQ.0) YK=2.*YK-1.

XCP(NPANEL)=XXL(1)+(XXL(2)-XXL(1))*YK*PSI(J)*CFtKK)

JSP 730

IF (ARS(YN(NPANEL,2)-YN(NPANEL,1)).LE.0.0001) CC

ZCP(NPANEL)=YN(NPANEL1)+(YN(NPANEL,2)-YN(NPANEL,1))*(YCP(NPANEL)-YK)

CONTINUE

ZCP(NPANEL)=Z

CONTINUE

XCP(NPANEL)=XXL(1)+(XXL(2)-XXL(1))*YK*PSI(J)*CFtKK)

JSP 730

CONTINUE

ZCP(NPANEL)=Z

CONTINUE

XCP(NPANEL)=XXL(1)+(XXL(2)-XXL(1))*YK*PSI(J)*CFtKK)

JSP 730

CONTINUE

XCP(NPANEL)=XXL(1)+(XXL(2)-XXL(1))*YK*PSI(J)*CFtKK)

JSP 730

CONTINUE

XCP(NPANEL)=XXL(1)+(XXL(2)-XXL(1))*YK*PSI(J)*CFtKK)

JSP 730

CONTINUE

XCP(NPANEL)=XXL(1)+(XXL(2)-XXL(1))*YK*PSI(J)*CFtKK)

JSP 730

CONTINUE

XCP(NPANEL)=XXL(1)+(XXL(2)-XXL(1))*YK*PSI(J)*CFtKK)

JSP 730

CONTINUE

XCP(NPANEL)=XXL(1)+(XXL(2)-XXL(1))*YK*PSI(J)*CFtKK)

JSP 730

CONTINUE

XCP(NPANEL)=XXL(1)+(XXL(2)-XXL(1))*YK*PSI(J)*CFtKK)

JSP 730

CONTINUE

XCP(NPANEL)=XXL(1)+(XXL(2)-XXL(1))*YK*PSI(J)*CFtKK)

JSP 730

CONTINUE

XCP(NPANEL)=XXL(1)+(XXL(2)-XXL(1))*YK*PSI(J)*CFtKK)

JSP 730

CONTINUE

XCP(NPANEL)=XXL(1)+(XXL(2)-XXL(1))*YK*PSI(J)*CFtKK)

JSP 730

CONTINUE

XCP(NPANEL)=XXL(1)+(XXL(2)-XXL(1))*YK*PSI(J)*CFtKK)

JSP 730

CONTINUE

XCP(NPANEL)=XXL(1)+(XXL(2)-XXL(1))*YK*PSI(J)*CFtKK)

JSP 730

CONTINUE

XCP(NPANEL)=XXL(1)+(XXL(2)-XXL(1))*YK*PSI(J)*CFtKK)

JSP 730

CONTINUE

XCP(NPANEL)=XXL(1)+(XXL(2)-XXL(1))*YK*PSI(J)*CFtKK)

JSP 730
*ORIGINAL PAGE IS OF POOR QUALITY*

```plaintext
REWIND 03
REWIND 04
J1=LWF+1
10 CONTINUE
IF (KF.EQ.0) GO TO 20
REWIND 1
REWIND 7
20 CONTINUE
IF (NW(2).EQ.0) GO TO 40
II=I+NCS
IF (NW(3).NE.0) GO TO 30
CHCRD=CH(1)+CH(II)
GO TO 50
30 III=II+NCS
CHORD=CH(1)+CH(II)+CH(III)
GO TO 50
40 CHORD=CH(1)
50 CONTINUE
CALL WING (AW,BW,LPANEL,AW,BW,AW,LPAN1,LPAN2,KF)
X=(XCP(1)-XLE(IG))/CHORD
CAM=ZCR(XC)-(ZCR(XC)-ZCTCXC)*YCP(1)/HALFE
AW(J1)=-CAM
BW(J1)=0.
IF (KF.EQ.0) GO TO 60
READ (07) (GAN(2,LK),LK=1,NTL)
READ (01) (GAP(19,LK),LK=1,INTL)
DO 60 LK=1,INTL
KK=LPANEL*LK
BW(KK)=GAN(1,LK)
60 AW(KK)=GAN(2,LK)
X0=XCP(1)
W=0,
DO 70 KK=1,LPANEL
70 AW(KK)=AW(KK)+W*KW*KP
DO 80 KK=1,LPANEL
80 CONTINUE
WRITE (03) (AW(JJ),JJ=1,J1)
WRITE (04) (BW(JJ),JJ=1,J1)
```

IJO=2
NJ=LPANEL-1
90 CALL WING (AW*BW*LPANEL*IJ*P*LPAN1*LPAN2*KF)
IF (NW(2).EQ.0) GO TO 110
II=IG+NCS
IF (NW(3).NE.0) GO TO 100
CHORD=CH(IG)+CH(II)
CHFL=CH(IG)
GO TO 120

100 III=II+NCS
CHCRD=CH(IG)+CH(II)+CH(III)
CHFL=CH(IG)+CH(II)
GO TO 120

110 CHCRD=CH(IG)
CHFL=CH(IG)
120 CONTINUE
FCR=CHFL/CHORD
XC=(XCP(IJ)-XLE(IG))/CHORD
CAM=ABS(XC=FCR)
FCR1=FCR-0.01
FCR2=FCR+0.01
C7=0.
IF (ABS(I-J-XC).LE.0.01) GO TO 130
7C1=7CR(XC)
7C2=7CT(XC)
CZ=ZC1-(ZC1-ZC2)*YCP(IJ)/HALFP
CONTINUE
FCP=CHFL/CHORD
XC=(XCP(IJ)-XLE(IG))/CHORD
CAM1=ZCR(XC1)-(ZCR(XC1)-ZCT(XC1))*YCP(IJ)/HALFP
CONTINUE
IF (XC.LT.FCP1)
C7=0.
IF (CAM.LT.0.001)
CAM=CZ-0.5*DF(LL)
IF (ABS(1.-XC).LE.0.01)
CAM=-DF(LL)+CAMTEP-(CANTER-CATET)*YCP(IJ)
CONTINUE
IF (PTIAL.LE.0.01.AND.XC.GT.FCR2)
GO TO 180
IF (PTIAL.GT.0.01)
GO TO 150
IF (DF(LL).GT.0.01.AND.XC.GT.FCR1) GO TO 180

140 IF (IJ.NE.N6) GO TO 160
IF (ABS(XC-1.).LE.0.01) GO TO 160
JK=1
IF (NW(3).NE.0.AND.IJ.GT.LPAN1)
JK=2
NCM=IJO*(NC-S-IG)*NW(JK)+(IG-1)*NW(JK+1)+1
XC1=(XCP(NCM)-XLE(IG))/CHORD
CAM1=ZCR(XC1)-(ZCR(XC1)-ZCT(XC1))*YCP(IJ)/HALFP
CAM=(CAM+CAM1)/2.
GO TO 180

150 IF (IJ.GE.MJWI(1,LL).AND.IJ.LE.MJW2(1,LL)) GO TO 170
IF (IJ.GE.MJWI(2,LL).AND.IJ.LE.MJW2(2,LL)) GO TO 180
IF (IJ.GE.MJWI(3,LL).AND.IJ.LE.MJW2(3,LL)) GO TO 180
CAM=CZ
GO TO 140
160  CAI=CAPTER-(CAPTER-CAMTE)*YCP(IJ)/HALFR
GO TO 180
170  IF (XC.GT.FCR1) GO TO 180
GO TO 140
180  CONTINUE
AW(IJ)=CAI
BW(IJ)=0.
IF (KF.EQ.0) GO TO 210
READ (07) (GAM(2,LK),LK=1,NTL)
READ (01) (GAM(1,LK),LK=1,NTL)
DO 190 LK=1,NTL
KK=LPANEL+LK
AW(KK)=GAM(1,LK)
190  BQ=XCP(IJ)
YQ=YCP(IJ)
7O=ZCP(IJ)
WK=O.
CALL FUSVOL (BQ,YQ,ZQ,WK,WKGPOO.O)
DO 200 KK=1,LPANEL
200  AW(KK)=AW(KK)+WK*WKN*CP(KK)
210  CONTINUE
WRITE (03) (AW(JJ),JJ=1,J1)
WRITE (04) (BW(JJ),JJ=1,J1)
IF (IJE.LPAN1.AND.IJE.LT.LPAN2) NG=TW(2)
IF (IJE.GE.LPAN2.AND.IJE.LT.LPANEL) NG=TW(3)
DO 220 LL=1,NF
IF (LL.GT.NF) GO TO 240
220  CALL FUSVOL (B*Q,YQ,ZQ,WK,WKGPOO.O)
DO 250 KK=1,LW
250  WRITE (03) (AW(KK),KK=1,LW)
WRITE (04) (BW(KK),KK=1,LW)
AW(JI)=O
BW(JI)=O.
IF (KJ.EQ.NF) GO TO 240
XI=XCF(KI)-XTEF
XB=XCF(KI)-XLEF
IF (KJ.EQ.NF) RFL=O.
IF (KJ.EQ.NF) RFL=X/SORT(XS*XS+P*RF(KI)*RF(KI))
RF1=XS*(1.*RFL)
RF0=XB*(1.*XG/SGRT(XG*XB+RF(KI)*RF(KI)))
DO 230 KK=1,LPANEL
230 AW(KK)=AW(KK)+WK*CP(KK)
CONTINUE
WRITE (03) (AW(JJ),JJ=1,J1)
WRITE (04) (BW(JJ),JJ=1,J1)
CONTINUE
IC=IC+1
IF (ABS(R1-R2) .LE. 0.001) GO TO 270
IF (IC.LE.2) GO TO 10
CONTINUE
IC=IC+1
AM=AM2
IG=1
NG=NGW(1)
MG=MNW(1)
IF (ABS(R1-R2) .LE. 0.001) GO TO 270
IF (IC.LE.2) GO TO 10
CONTINUE
IF (KF.EQ.0) GO TO 10
REWIND 1
REWIND 7
CALL VELFUS (LWF, LPANEL, AW, BW, JW, LPAN1, LPAN2, 2, ISYM)
REWIND 1
REWIND 7
READ (08) (CG(I),I=1,LAST)
CONTINUE
REWIND 09
J1=LWFJ
LP1=LTOTAL+1
MJ=LPANEL+NCJ(I)
MCN=LAST+NCJ(I)
IPHI=1
JL=LAST+1
INK=1
LN=1
LN1=1
JNA=1
VMUC=VMU*ALPC
MK=1
I=LAST+1
I1=JANEL
CALL MATRIX (AW, BW, LTOTAL, LPANEL, VMUC, I, MCN, MJ, IPHI, INK, LN, LN1, TF)
IF (KF.EQ.0) GO TO 50
VK=VMUC
TM=TEMP
IF (EXIT.LE.0.001) GO TO 20
IF (NNJ.EQ.1) GO TO 20
VK=1.
TM=1.
DO 30 KK=1,LAST
   IF (KK.LE.LPANEL) KG=KK+JPANEL
   IF (KK.GT.LPANEL) KG=KK-LPANEL+JPANEL
   AW(KQ)=AW(KQ)-WK2*WKN*CG(KK)*T VK*VK
   00 LK=I1NTL
   KK=LTOTAL+LK
   RW(KK)=-GAM(1,LK)*TM*VK*VK
   30 AW(KK)=-GAM(2,LK)*TM*VK*VK
   CONTINUE
WRITE (03) (AW(JJ),JJ=1,J1)
WRITE (09) (RW(JJ),JJ=1,J1)
KI=2
NI=TOTAL-1
CONTINUE
LI=LAST+2
VMP=VMUC
KJ=LI
IF (LI.GT.LAST) KJ=LI-JPANEL
CALL MATRIX (AW,BW,LTOTAL,LPANEL,VMP,LI,MCON,KJ,IPHII,INN,LN1,TE)
IMP,LPAN1,ISYM,KCODE,EXIT,LPAN2,KF)
IF (KF.EQ.0) GO TO 130
XO=XCP(KJ)
YQ=YCP(KJ)
ZQ=ZCP(KJ)
IF (LI.GT.LAST) GO TO 90
READ (07) (GAM(2,LK),LK=INTL)
READ (01) (GAM(1,LK),LK=ITL)
DO 70 LK=1,NTL
KK=LTOTAL+LK
BW(KK)=GAM(1,LK)
CALL FUSVOL (B1,XQ,YQ,ZQ,WN,WK,GP0,0,0)
DO 80 KK=1,LAST
IF (KK.LE.LPANEL) KG=KK+2*JPAKEL
IF (KK.GT.LPANEL) KG=KK-LPANEL+JPAKEL
AW(KK)=AW(K0)-WK2*WKN*CG(KK)*TP*VK*VK
GO TO 130
DO 120 JK=1,NTL
KK=LTOTAL+JK
BW(KK)=-GAM(1,JK)*TP*VK*VK
AW(KK)=-GAM(2,JK)*TM*VK*VK
CONTINUE
WRITE (03) (AW(JJ),JJ=1,J1)
WRITE (09) (BW(JJ),JJ=1,J1)
IF (KJ.LE.MJ) GO TO 140
IPHI=IPHII+1
MJ=MI+1J(CI(III)
CONTINUE
MJ=MIJ(III)-1
IF (KJ.EQ.MJ1) GO TO 150
GO TO 160
JNA=JN
160 IF (KJ.EQ.WJ(JNK)) IPI=1
160 IF (LI.EQ.LTOTAL) GO TO 170
160 GO TO 180
170 CONTINUE
170 IPI=1
170 NJ=LPANEL+NCJ(1)
170 JNK=1
170 INK=1
180 CONTINUE
180 KI=KI+1
180 NI=KI-I
180 IF (LI.EQ.O.LTOTAL) GO TO 190
180 IF (LI.EQ.LAST) GO TO 200
180 LI=LI+1
180 GO TO 210
190 LI=LPANEL+1
190 GO TO 210
200 LI=1
200 CONTINUE
200 JP=LI-LAST.LPANEL
200 JPJ=JP-1
200 IF (JPJ.EQ.MJJ(LKI)) LN=LN+1
200 IF (JPI.EQ.MJJ(LN)) LN=LN+1
200 IF (KI.LE.LTOTAL) GO TO 60
200 IF (KF.EQ.0) GO TO 240
200 J01=JPANEL-1
200 DO 220 KJ=1,JPANEL
210 AW(KJ)=O.
210 RW(KJ)=O.
210 DO 230 KJ=1,NTL
220 READ (07) (AW(KK),KK=J01.LWJ)
220 READ (01) (RW(KK),KK=J01.LWJ)
220 WRITE (03) (AW(JJ),JJ=1,J1)
220 WRITE (09) (RW(JJ),JJ=1,J1)
230 WRITE (03)
240 CONTINUE
240 RETURN

SUBROUTINE MATRIX

DIMENSION AW(l), RW(l)
DIMENSION W(4), V(4)
DIMENSION SV(300), SW(300)
COMMON /BEOM/HALFSW,XCP(200),YCP(200),ZCP(200),XLE(50),YLE(50),XTMAT,IE(50),PSI(20),CH(95),XV(200),YV(100),SN(R8),XK(200,2),YN(200,2),ZMAT,EX(95,2),TX(95,2)

TO COMPUTE THE JETON INFLUENCE COEFFICIENT MATRICES

END
3,2),SC(160,5),SI(160,5),LC(3)  MAT 100
COMMON /SCHEME/ C(2),X(10,41),Y(10,41),SLOPE(15),XL(2,15),XTT(41),MAT 110
1XLL(41) MAT 120
COMMON /AERO/ AM1,AM2,B1,B2,CL(30),CT(30),CD(30),GAM(2,130) MAT 130
COMMON /CONST/ HCS,NCW,M1(8),NSJ,ACJ(5),LAST,KM1(3,5),KM2(3,5) MAT 140
IPANEL,NMJ(5),NW(3),NNJ,NJP MAT 150
COMMON /PARAM/ ALPT,ALPC,APLS,CDF,SDF,TH,TDF  MAT 160
EQUIVALENCE (X(1,1),SV(1)) MAT 170
PI=3.14159265 MAT 180
ZJET=YCON(25) MAT 190
IUSE=YCON(24) MAT 200
JCOT=XTE(50) MAT 210
DFJ=CDF MAT 220
VUT=VMU MAT 230
TEM=TEMP MAT 240
NN2=NNJ-1 MAT 250
N1=NNJ-1 MAT 260
N2=NNJ-2 MAT 270
N3=NNJ-3 MAT 280
NJ= (NSJ+1)/2+1 MAT 290
IF (ISYM.EQ.0) NJP=NSJ/2 MAT 300
IF (ISYM.EQ.0) NP=NSJ+1 MAT 310
IF (ISYM.NE.0) NP=NSJ+1 MAT 320
NJT=NJK-1 MAT 330
IZ=1 MAT 340
IP=1 MAT 350
IFF=1 MAT 360
MNN=NW(1) MAT 370
NN=NW(1) MAT 380
IND=1 MAT 390
ISH=1 MAT 400
JKT=1 MAT 410
L1=LPANEL+1 MAT 420
LAST1=LAST-1 MAT 430
IF (I.GT.LAST) GO TO 10 MAT 440
IJ=I MAT 450
GO TO 20 MAT 460
10 IJ=I-LPANEL MAT 470
20 CONTINUE MAT 480
DO 260 J=1,LAST MAT 490
M1=J-1+1 MAT 500
FN=AN  MAT 510
IF (J.EQ.(LPANEL+1).OR.J.EQ.(LPANEL+1)) IP=1 MAT 520
IF (JCOT.EQ.1.AND.J.GT.LPANEL) GO TO 30 MAT 530
GO TO 40 MAT 540
30 IF (JKT.EQ.1.OR.JKT.EQ.(NJH+1)) IP=1 MAT 550
40 CONTINUE MAT 560
IF (J.GT.LPANEL.1.AND.J.LE.LPANEL) ISN=2 MAT 570
IF (J.GT.LPANEL.1.AND.J.LE.LPANEL) ISN=3 MAT 580
IF (J.GE.LPANEL.AND.J.LT.LPANEL) GO TO 50
    GO TO 60
  50
    NN=NW(2)
    IF (J.GE.LPAN2.AND.J.LT.LPANEL) NN=NW(3)
    CONTINUE
    IF (J.GE.LPANEL.AND.J.LT/MMJ(IND)) NN=NCCJ(IND)
    CHCRD=CH(IZ)
    IF (J.EQ.L1) 60 TO 70
    GO TO 80
  70
    ISN=ISN+1
    L1=MMJ(IND)+1
    NL=NMJ(IND)-1
    IF (NL.EQ.0) 60 TO 90
    IF (J.EQ.NL) IND=IND+1
  90
    CONTINUE
    X1=XN(J+1)-XCP(IJ)
    X2=XN(J+2)-XCP(IJ)
    X12=YN(J+1)-YN(J+1)
    X1=ZN(J+1)-ZN(J+1)
    Z2=ZN(J+1)-ZCJ(IJ)
    Z12=YN(J+2)-Z12=Z12
    XZJ=X1*Z12-Z1*X12
    DO 240 II=1,12
      IF (II.EQ.1) GC TO 100
      N=2
      GO TO 110
    100
      N=2
      GO TO 110
    110
    CONTINUE
    YC=(-1.)**N*YCP(IJ)
    Y1=YN(J+1)-YC
    Y2=YN(J+2)-YC
    XYK=X1*Y12-Y1*X12
    YZI=Y1*Z12-Z1*Y12
    ALP1=XYK*XYK+XZJ*XZJ
    R1=SQRT(X1*X1+Y1*Y1+Z1*Z1)
    R2=SQRT(X2*X2+Y2*Y2+Z2*Z2)
    UUB1=(X2*X1+Y2*Y1+Z2*Z1)/R2-(X1*X1+Y1*Y1+Z1*Z1)/R1
    G1=(1.-X1/R1)/R1+(Y1*Y1+Z1*Z1)
    G2=(1.-X2/R2)/R2+(Y2*Y2+Z2*Z2)
    IF (J.GT.LPANEL) GO TO 130
    F1=XYK/ALP1
    F2=-Y2*G21+Y1*G1
    IF (J.GT.LPANEL) GO TO 120
    H2=F2
    IF (J.EQ.1.AND.KF.NE.0) H2=-Y2*G21
    GO TO 220
  120
    F3=0.
F4=0.
F1=2.*F1
F2=2.*F2
H2=F2.
IF (IP.EQ.1.AND.KF.NE.0) H2=-2.*Y2*G2P1
GO TO 220
130 CONTINUE
IF (J.LE.LPANEL) GO TO 150
IF (ABS(E1-B2).LT.0.001) GO TO 140
ALP2=XYK*XYK+XZJ*XZJ+B2*Y1*Y1
R1B2=SORT(X1*X1+B2*Y1*Y1+B2*Z1*Z1)
R2R2=SORT(X2*X2+B2*Y2*Y2+B2*Z2*Z2)
1/R1R2
G1B2=(1.-X1/R1B2)/(Y1*Y1+Z1*Z1)
G2B2=(1.-X2/R2B2)/(Y2*Y2+Z2*Z2)
GO TO 150
140 ALB2=ALP1
UUP2=UUB1
G2B2=G2B1
G1P2=G1P1
150 CONTINUE
IF (I.GT.LAST) GO TO 180
F1=UUP1*XZJ/ALP1
F12=UUB1*XYK/ALB1
G12=Z2*G2B1-Z1*G1P1
H12=G13
H12=612
IF (IP.EQ.1.AND.KF.NE.0) H13=Z2*G2P1
IF (IP.EQ.1.AND.KF.NE.0) H12=-Y2*G2P1
IF (J.LE.LPANEL) GO TO 160
F2=UUB2*XZJ/ALBP
F22=UUB2*XYK/ALBP
G22=Z2*G2B2-Z1*G1P2
G22=-Y2*G2B2+Y1*G1B2
GO TO 170
160 F22=0.
G22=0.
F23=0.
G23=0.
170 F1=F13*Y(4,IPHI)*(-1.)*+H+F12*Y(3,IPHI)
F2=G13*Y(4,IPHI)*(-1.)*+H+G12*Y(3,IPHI)
F3=F33*Y(4,IPHI)*(-1.)*+H+F22*Y(3,IPHI)
F4=G23*Y(4,IPHI)*(-1.)*+H+G22*Y(3,IPHI)
H2=F13*Y(4,IPHI)*(-1.)*+H+F12*Y(3,IPHI)
IF (J.LE.LPANEL) GO TO 180
F1=F1*2.
F2=2.*F2
F3=2.*F3
F4=2.*F4
H2=2.*H2
GO TO 210
180 F1=UUB1*YZI/ALP1
IF (EXIT.LE.0.001) GO TO 190
IF (NNJ.EQ.1) GO TO 190
IF (IJ.GT.LPANEL.AND.IJ.LE.MM(I)) VMU=1.
IF (IJ.GT.LPANEL.AND.IJ.LE.MM(I)) TEMP=1.
190 CONTINUE
F2=0.
H2=0.
IF (J.LE.LPANEL) GO TO 200
F3=UUB2*YZI/ALP2
F4=0.
F1=-F1*VMU*VMU*2.*TEMP
F3=-F3*2.
GO TO 210
200 F1=-F1*VMU*VMU*TEMP
210 CONTINUE
W(I)=IF1*F2)*SN(MT,ISN)/(P.*FN)
V(I)=(F1*H2)*SN(MT,ISN)/(P.*FN)
IF (J.LE.LPANEL) GO TO 220
IF (IJ.EQ.2) GO TO 230
K2=II+2
W(K2)=(F3+F4)*SN(MT,ISN)/(P.*FN)
220 CONTINUE
240 CONTINUE
IF (J.LE.LPANEL) GO TO 250
I2=I+1
IP=IP+1
IF=IF+1
MM=VM+NN
IF (J.GT.LPANEL) JKT=JKT+1
IF (JKT.FO.(NP+1)) JKT=1
250 CONTINUE
IF (J.LE.LPANEL) JA=J+2*LPANEL
IF (J.GT.LPANEL) JA=J-CPD*SN(MT,ISN)/(P.*FN)
AW(JA)=V(1)+V(2)
BW(JA)=W(1)-W(2)
SV(JA)=V(1)
SW(JA)=W(1)
IF (J.LE.LPANEL) GO TO 260
J1=J-CPD
AW(J1)=W(3)
BW(J1)=W(3)
VMU=VMU
TEMP=TEMP
260 CONTINUE
IF (KCODE.EQ.0) GO TO 380
IF (IUSR.EQ.1.AND.ZJET.GT.0.01) GO TO 360
IF (DFJ.LE.0.0001) GO TO 360
IF (NNJ.EQ.1.AND.I.LE.LPANEL) GO TO 360
IF (NNJ.EQ.1.AND.I.GT.LPANEL) GO TO 270
IF (I.LE.WJJ(N1).OR.I.GT.LAST) GO TO 360
CONTINUE
270 IF (I.GT.LAST) GO TO 360
IF (IPHI.EQ.NJH) GO TO 360
MAT2120
IF (IPHI.EQ.NJH) GO TO 360
MAT2130
IF (NNJ.EQ.1) WJNI=LPANEL
MAT2140
IF (NNJ.EQ.1) WJNI=LPANEL
MAT2150
IF (NNJ.EQ.1) WJNI=LPANEL
MAT2160
IF (NNJ.EQ.1) WJNI=LPANEL
MAT2170
RESTART 2
IF (NNJ.EQ.1) WJNI=LPANEL
MAT2180
IF (NNJ.EQ.1) WJNI=LPANEL
MAT2190
IF (NNJ.EQ.1) WJNI=LPANEL
MAT2200
IF (NNJ.EQ.1) WJNI=LPANEL
MAT2210
IF (NNJ.EQ.1) WJNI=LPANEL
MAT2220
IF (NNJ.EQ.1) WJNI=LPANEL
MAT2230
IF (NNJ.EQ.1) WJNI=LPANEL
MAT2240
DSTJ=DJF
MAT2250
DLX=DSTJ*0.5*PI/FJNI
MAT2260
SZX=(1.-VMU)
MAT2270
CALL SKIP (I*,JPAKEL)
MAT2280
DO 310 JJ=1,FM
MAT2290
READ (02) (SV(K),K=I*JPANEL)
MAT2300
IF (JJ.EQ.MF) GO TO 280
MAT2310
DXTJ=DLX*PSI(JJ)/TH
MAT2320
GO TO 290
280 DXTJ=DLX*PSI(JJ)*0.5/TH
MAT2330
290 CONTINUE
MAT2340
PROC=S7X*DXTH
MAT2350
DO 300 K1=1,JPANEL
MAT2360
KK=K1+JPANEL
MAT2370
300 AW(KK)=AW(KK)+PROC*SV(K1)
MAT2380
CONTINUE
MAT2390
IF (EXIT.LE.0.001) GO TO 370
MAT2400
IF (EXIT.LE.0.001) GO TO 370
MAT2410
CONTINUE
MAT2420
CONTINUE
MAT2430
CONTINUE
MAT2440
CONTINUE
MAT2450
CONTINUE
MAT2460
CONTINUE
MAT2470
CONTINUE
MAT2480
CONTINUE
MAT2490
CONTINUE
MAT2500
CONTINUE
MAT2510
CONTINUE
MAT2520
CONTINUE
MAT2530
CONTINUE
MAT2540
IF (NNJ.EQ.1) GO TO 370
IF (IJ.GT.LPANEL.AND.IJ.LT.JJ(1)) VMU=1.
IF (IJ.GT.LPANEL.AND.IJ.LT.JJ(1)) TEMP=1.
CONTINUE
370 IF (I.LE.LAST) GO TO 730
IF (IPHI.EQ.NJH) GO TO 590
IF (ISYM.NE.0.AND.IPPI.EQ.1) GO TO 590
IF (NNJ.EQ.1) GO TO 450
IF (IJ.GT.LPANEL) GO TO 450
IF (IPHI.GT.NJH.AND.ZJET.LE.0.01) GO TO 450
IF (IPHI.GT.NJH) LI=NJH
IF (ISYM.EQ.0.AND.IPPI.GT.NJH) LI=NJH+1
IF (IPHI.LE.NJH) LI=1
NZ=1
IF (NW(2).NE.0.AND.NW(3).EQ.0) NZ=0
IF (NW(2).NE.0) N7=3
IF (NNJ.LE.3.AND.NW(2).EQ.0) IP=2
IF (NNJ.LE.3.AND.NW(2).EQ.0) IR=1
IF (NNJ.GE.4.AND.NW(3).EQ.0) IR=2
DO 440 NR=1,NZ
KI=KJ(1,1=1=1)*IPHI-L1-ISYP
KNW=NW(NJ)
KI=KI-KNW
KP=KP-1
3
MR=IF (KI.GT.0) GO TO 390
KI=KI+KNW
KP=KP+1
PR=2
390 DO 430 NR=1,MR
SUM=0.
SUMB=0.
DO 400 KK=1,KRW
KL=KI+KK
JA=JL+2*JPANEL
SUMB=SUMB+SW(JA)
SUM=SUM+SV(JA)
400 CALL INTEG (RFS,KNW,KI,K2,1J,PI,IR)
DO 420 KK=1,KRW
KL=KI+KK
JA=KL+2*JPANEL
AA=1.
DO 410 L=1,KRW
LL=L+1
IF (L.EQ.KK) GO TO 410
AA=AA*(XCP(IJ)-XV(LL))/(XV(KL)-XV(LL))
410 CONTINUE
AW(JA)=AW(JA)-SUP*AA-RES*AA*VWU*VWU*TEMP
BW(JA)=PW(JA)-qUWEAA-RES*AA*VHU*VWU*TEMP

420   CONTINUE
K1=K1+KNW
K2=K2+1
420   CONTINUE
IP=IP+1
440   CONTINUE
450   CONTINUE
IF (KCODE.EQ.0) GO TO 590
IF (NW(P).EQ.0) NSTrip=NC
IF (NW(2).NE.0) AND NW(3).EQ.0) NSTrip=NC*2
IF (NW(3).NE.0) NSTrip=NC*3
IF (IPHI.LT.NJI-) IP=JP+
IF (IPHI.GT.NJH) IP=IASYM+1
IF (CNNJ.EQ.1) GO TO 500
IF (IJST*$MJJ(N)) GO TO 500
IF (NNJ.EQ.1) GO TO 500
IF (IJST*$MJJ(N2)) GO TO 510
IF (NNJ.EQ.3) GO TO 510
IF (IJST*$MJJ(N3)) GO TO 490
IF (NNJ.EQ.4) GO TO 470
IF (NNJ.EQ.5,AND-IJST*$MJJ(NNJ-4)) GO TO 460
L1=NJ-4
I7=N :TRIP
GO TO 520
450   L1=N3
I7=N :TRIP*NP
GO TO 520
470   L1=N3
I7=N :TRIP
GO TO 520
430   L1=N3
I7=N :TRIP+(NNJ-3)*NP
GO TO 520
490   CONTINUE
L1=N3
I7=N :TRIP
GO TO 520
500   L1=NNJ
I7=N :TRIP+(NNJ-1)*NP
GO TO 520
510   L1=N1
I7=N :TRIP+(NNJ-2)*NP
520   CONTINUE
I7=I7+IP
NT=NJT
IF (ISYM.NE.0) NT=NJT-1
KNW=NCJ(L1)
DO 500 KP=1,N
SUMP=0.
SUM2=0.
SUM3=0.
SUMP=0.
K1=VWJ(J1)+NP*NCJ(L1)+(IP-1)*NCJ(L1) *(KP-1)*NCJ(L1)
DO 530 KK=1,KNW
KL=K1+KK
KJ=KL+JPANEL
IA=KL-LPANEL+JPANEL
IB=KJ-LAST
SUM3=SUM3+SW(IA)
SUM4=SUM4+BW(IP)
SUM1=SUM1+SV(IA)
530 SUM2=SUM2+AW(IB)
CALL INTEG (RES+K1, K1, IJ, IJ, B1, L1)
IF (ABS(B1-P2) .LE. 0.001) GO TO 540
CALL INTEG (RES+K1, K1, IJ, IJ, P2, L1)
GO TO 550
540 REF=RES
550 DO 570 KK=1,KNW
KL=K1+KK
KJ=KL+JPANEL
IA=KL-LPANEL+JPANEL
IB=KJ-LAST
AA=1.
DO 560 L=1,KNW
LL=K1+L
IF (L .GE. KK) GO TO 560
AA=AA*(XCP(IJ)-XV(LL))/(XV(KL)-XV(LL))
CONTINUE
560 CONTINUE
AW(IA)=AW(IA)-SUW1*AA-RES*AA*VW1*VW1*TFMP*P2
AW(IB)=AW(IB)-SUW2*AA-RES*AA*P2
BW(IA)=BW(IA)-SUM3*AA-RES*AA*VW1*VW1*TFMP*P2
BW(IB)=BW(IB)-SUM4*AA-RES*AA*P2
570 CONTINUE
IZ=IZ+1
580 CONTINUE
590 CONTINUE
SK=I.
IF (IPHI.GT.KJH) SK=-1.
JH=I-LAST+JPANEL
K=K1+LAST-NCJ(LN)+LPANEL
JN=NCJ(LN)
DO 610 KK=1,JKH
KL=K+KK
KJ=KL+JPANEL
IA=KL-LPANEL+JPANEL
IB=KJ-LAST
CONTINUE
610 CONTINUE
AA=1.0
DO 600 L=1,JKL
LL=K*L
IF (L.EQ.KK) GO TO 600
AA=AA*(XCP(JL)-XV(LL))/(XV(KL)-XV(LL))
600 CONTINUE

BW(IA)=BW(IA)-AA*VW*VM*TE*SK
BW(IB)=BW(IB)+AA*SK
AW(IB)=AW(IB)+AA*SK
AW(IA)=AW(IA)-AA*VU*VM*TE*SK
IF (I.EQ.CK.LT.LTOTAL) PCCN=WCON+NC(JK)
IF (KCODE.EQ.O) CC TO 700
IF (IUSB.EQ.1.AND.ZJET.GT.0.01) CC TO 700
IF (NNJ.EQ.1) GO TO 700
IF (J.GT.MJ(N2)) GO TO 660
IF (NNJ.EQ.4) GO TO 640
IF (NNJ.EQ.5.AND.IJ.GT.PJ(N3)) GO TO 640
KI=MJW(1,NJP)+*(IPHI-L-ISHYM)*NW(1)-1
KNW=NW(1)
GO TO 670

650 KJ=MJW(2,NJP)+*(IPHI-L-ISHYM)*NW(2)-1
KNW=NW(2)
GO TO 670

660 KI=MJW(3,NJP)+*(IPHI-L-ISHYM)*NW(3)-1
KNW=NW(3)
GO TO 670

670 DO 690 KK=1,KNW
KL=K1+KK
JA=KL+1*JANEL
AA=1.
DO 680 L=1,KNW
LL=K1+L
IF (L.EQ.KK) GO TO 680
AA=AA*(XCP(JL)-XV(LL))/(XV(KL)-XV(LL))
680 CONTINUE

MAT4020
MAT4030
MAT4040
MAT4050
MAT4060
MAT4070
MAT4080
MAT4090
MAT4100
MAT4110
MAT4120
MAT4130
MAT4140
MAT4150
MAT4160
MAT4170
MAT4180
MAT4190
MAT4200
MAT4210
MAT4220
MAT4230
MAT4240
MAT4250
MAT4260
MAT4270
MAT4280
MAT4290
MAT4300
MAT4310
MAT4320
MAT4330
MAT4340
MAT4350
MAT4360
MAT4370
MAT4380
MAT4390
MAT4400
MAT4410
MAT4420
MAT4430
MAT4440
MAT4450
MAT4460
MAT4470
MAT4480
MAT4490
MAT4500
PW(JA) = PW(JA) - AA*VMU*VU*TFP*O°

700 CONTINU
IF (KCODE.EQ.0) GO TO 730
IF (ZJET.GT.0.01) GO TO 730
IF (DFJ.LE.0.0001) GO TO 730
IF (NNJ.GE.1) GO TO 710
IF (IJ.LE.NMJJ(NJ)) GO TO 730

710 CONTINU
IF (IPHI.EQ.NWP) GO TO 730
IF (ISYM.NE.0.AND.IPHI.EQ.1) GO TO 730
DO 720 J=I,JPANFL
JJ=J+JPANEL
WRITE (02) (SV(J),J=1,JPANFL)
720 CONTINU
VMU=VUT
TFW=TFM
RETURN
C
END

SUPROUTINE SKIP (I,JPANEL) SKP
DIMENSION DUAY(?O)
IF (I.FO.1) GO TO 20 SKP
DO 10 J=1,I
READ (02) (DUAY(K),K=1,JPANEL)
10 CONTINUE
20 RETURN
END

OVERLAY (WNGJET,4,0)
.PROGRAN SOLUTN
C TO SOLVE THE JET CH AND JET OFF EQUATIONS
C
DIMENSION AW(330), CA(330), GAMMA(25000)
DIMENSION GAVMVR(330), GAWV(130)
COMMON /SDKODE/ KCODE
COMMON /SCHFFF/ C(2),X(10,41),Y(10,41),SLOPE(15),XL(2,15),XT(41)
1XL(41)
COMMON /SHEOM/ HALFW,XCP(200),YCP(200),ZCP(200),XLE(50),YLE(50),XTSOL
1E(100),PSI(20),CH(95),XY(200),YY(100),SN(88),XN(200,2),YN(200,2),TSOL
2N(200,2)
2N(200,2),WIDTH(8),YCON(25),SKEEP(50),MALFEB, SJ(21,2),EX(95,2),Rs(95SOL
32),SC(160,5),S(l60,5),LC(3)
COMMON /PARAM/ ALPT,ALPC,ALPS,CDF,SEF,TH,TFD
COMMON /AERO/ AP1,AM2,R1,P2,CL(30),CT(30),CD(30),GAM(2,130)
COMMON /ADD/ CP(130),CM(30),BREAK(R),SWP(8,15),GAL(30),ISYM,VBU,VUSOL
1,TEMP,FCP,CAMLEP,CAMLE,FAMLEP,CAMER,CAMTFT,XJ,YJ,ZJ,RF,ALPCREF,TWISTR
SOL 200
COMMON /CONST/ NCS, NCW+M1, XAS, NCJ, LAST, MW1(3,5), MW2(3,5), JSOL, 210
IPAKEL+MJJ(5), NW(3), NNJ, NJP
COMMON /COST/ LTOTAL, LPAN1, NW(5), LPANFL, IENTH, LPAN2, EXIT, PTIAL, TNSOL, 220
IST, DDF(5), NFP
COMMON /SOME/ NC, NWING, LAT, NAL, LWF, LWFJ, CHORDT, SNG, YP, YC, YCH, 230
1(6), WKX, REYX, MDG, NDG
 COMMON /FUS/ XF(20), XCF(20), RF(20), SNP(5, 20), XLEF, XTEF+XARD(20), NC, 240
 IUM, NF+NT, CSF(5+10), XAS(6), MKF(5), F0, F10, KF, KTL
REWIND 03
REWIND 08
IUSP=240
NC=230
ZZ=220
ITh=210
IC=200
J1=190
LP1=180
AR=170
AR=160
DF=150
PI=140
G0=130
SS=120
CS=110
IF (KF.EQ.0) GO TO 10
S=XTEF-XLEF
F0=4.*PI*CS*PDX
G0=0.
GB0=0.
GR0=0.
CALL FALONE (BCS, AW, CAN, GAMMA)
10 CONTINUE
20 CONTINUE
18=1
WS=AW(1)
NG=AW(1)
REAC (03) (AW(I), I=1, J1)
XP=XCP(1)
YP=YCP(1)
ZR=ZCP(1)
PHRV=0.
WN=0.
IF (IUSF.EQ.1, AND, ITN.EQ.0) GO TO 30
CALL INDVEL (XP, YP, ZR, XV, YJ, ZJ, RP, PHRV, PHX, TEMP, VU, FY, ISYM)
30 CONTINUE
IF (KF.EQ.0) GO TO 40
CALL FUSVOL (P, YB, YB, ZB, WN, WK, GB0+1, 0)
40 CONTINUE
\begin{verbatim}
AW(J1) = AW(J1) + XTT(IG) + PHRV/(ALPC*VU) + WN
DO 50 I = 1, LWF
50 GAMMA(I) = -AW(I+1)/AW(I)
NJ = LWF - 1
DO 110 IJ = 2, LWF
READ (03) (AW(K), K = 1, NJ)
WN = 0.
XR = XCP(IJ)
YR = YCP(IJ)
ZR = ZCP(IJ)
IF (IJ .GE. IG .AND. IG .LE. IN) GO TO 60
CALL INDEL (XP, YP, ZP, W, V, P, Q, R, B, P, PHRV, PHX, TEMP, VU, PHV)
CONTINUE
IF (IJ .LE. LPAKE) ALPT = XTT(I)
IF (IJ .GT. LPAKE) GO TO 70
GO TO 20
70 ALPT = 0.
I = IJ - LPAKE
IF (IJ .GT. NF) GO TO 90
KI = I
XS = XCF(KI) - XTEF
XB = XCF(KI) - XLFF
IF (KI .GT. NF) PFL = 0.
IF (KI .GT. NF) PFL = XS / SQRT(XS*XS + P*RF(KI)*RF(KI))
RF = XS/(1. + RFL)
F0 = XB*(1. + XR/SQRT(XF*XF + P*RF(KI)*RF(KI)))
ALPT = SS*RF(KI) - RF(KI) - (RF1*RF0)*F10/(4.*PI)
GO TO 90
80 IF (KF .EQ. 0) GO TO 90
CALL FLSVOL (B, XP, YP, ZP, W, V, P, Q, R, B, P, PHRV, PHX, TEMP, VU, PHV)
CONTINUE
AW(J1) = AW(J1) + PHRV/(ALPC*VU) + WN*ALPT
IK = IJ
CALL VMSEQN (NJ, IK, AW, GAMMA, CA)
NJ = NJ - 1
IF (IJ .GE. LPAKE) AND (IJ .LT. LPAKE) AND (IJ .LT. LPAKE) AND (IJ .LT. LPAKE) AND (IJ .LT. LPAKE)
AG = AW(2)
IF (IJ .GE. LPAKE) AND (IJ .LT. LPAKE) AND (IJ .LT. LPAKE) AND (IJ .LT. LPAKE) AND (IJ .LT. LPAKE)
AG = W(3)
IF (IJ .LT. MG) GO TO 100
IG = IG + 1
MG = MG + AG
100 IF (IJ .EQ. LPAKE) OR (IJ .EQ. LPAKE)
110 CONTINUE
DO 120 I = 1, LWF
120 GAMMA(I) = GAMMA(I)
IF (ABS(B1 - R2) .LE. 0.001) GO TO 130
IC = IC + 1
BB = P2
A = P2
IF (IC .GT. 2) GO TO 130
\end{verbatim}
GO TO 200

130 CONTINUE

VMUC=VMUC*ALPC

CALL SOLUJ (VMUC, VMUC*TEMP, LPANEL, LPAN1, LPAN2, LWFJ, LTOTAL, LAST, ISYM)

1, KCCDE, EXIT, AW, KJ, WJW1, WJ, N, KJP, ZC, CAMTER, CAMTET, YCP, HALFE, DFJ

2, TDF, GAMW, GAMW, AW, CA, JPN, LPANEL, MJW2 = 0.0, 0.0, 0.0, 0.1, 0.0, NTL, KF)

J7 = JPN + 1
IA = 2 * JPN
JPAK1 = IA + 1

DO 140 I = 1, LWFJ

140 GAMV (I) = GAMW (I)

IF (IUSP.EQ.1.AND. JTN.EQ.0) GO TO 230

IG = 1

MG = NW (1)

NG = NW (1)

R = PI

REDMN = 0.3

REAC (0.2) (AW (I) * I = 1 * J)

WF = 0.0

IF (KF.EQ.0) GO TO 150

XO = XCP (I)

YO = YCP (I)

Z0 = ZCP (I)

CALL FUSVOL (P, XE, YO, Z0, WN, WK, GPO, 1, 0)

CONTINUE

AW(I1) = AW(I1) + XTT (IG) + WN

DO 140 I = 1, LWFJ

140 GAMW (I) = -AW(I1) / AW (I)

NJ = LWF = 1

DO 160 IJ = 2, LWF

RFAC (0.3) (AW(k), K = 1 * J)

WN = 0.0

IF (IJ LE LPANEL) ALPT = XTT (IG)

IF (IJ GT LPANEL) GO TO 170

GO TO 180

150 CONTINUE

AW (IJ) = AW (IJ) + XTT (IG) + WN

DO 160 IJ = 2, LWF

160 RFAC (0.3) (AW(I), I = 1 * J)

WN = 0.0

IF (IJ LE LPANEL) ALPT = XTT (IG)

IF (IJ GT LPANEL) GO TO 170

GO TO 180

170 ALPT = 0.0

IJ = J - LPANEL

IF (I.EQ.NF) GO TO 190

KI = I

XS = XCF (KI) - XTF

XR = XCF (KI) - XLEF

IF (KI .EQ. NF) RFL = 0.0

IF (KI .NE. NF) RFL = YS * SQRT (XS * XS + R*RF(KI)*RF(KI))

RF1 = XS * (1.0 + RFL)

RF0 = XR * (1.0 + RF0) * YS * RF(KI) / (4.0 * PI)

GO TO 190

180 IF (KF .EQ. 0) GO TO 190

X0 = XCP (IJ)
Y0 = YCP (IJ)
Z0 = ZCP (IJ)
CALL FUSVOL (F, XG, YG, Z0, WX, WK, GP, 1.0)
190 CONTINUE
AV (JI) = AW (JI) + WA * ALPT
IK = J
CALL WMRAG (NJ, IK, AW, GAMMA, CA)
NJ = J - 1
IF (I, GE, LPAN) AND IJ, LT, LPAN?) ACG = NW (2)
IF (I, GE, LPAN?), AND IJ, LT, LPANF() NC = NW (3)
IF (I, LT, MG) GC TO 290
IF = TG + 1
MG = YG * NG
200 IF (I, EQ, LPAN!), OR, IJ, EQ, LPAN2) IC = 1
210 CONTINUE
DO 220 I = 1, LWF
220 GAM (2, I) = GAMMA (I)
CD 3116
GO TO 250
230 DO 240 I = 1, LWF
240 GAM (2, I) = GAM (1, I)
250 CONTINUE
CA = CA * ALPT
CA = CA * ALPT
CALL IPURST (LTCTAL, LPANEL, GANVR, GAMDA, CAM, LPAN, VU, XJ, YJ, ZJ, RJ, TF)
IF (EL, ICE, YPAN2, CAP, 5NC, YG, LW, LW, R, LW, W, CA, CP, 0, 0, 0, 0, 0) IC = 1
DO 260 I = 1, LWF
260 CP (I) = GANVR (IP, CP (IC, I))
IF (LAT, NE, 1) 6C TO 270
REWIND 02
REWIND 07
WRITE (07) (CC (I), I = 1, NCS)
WRITE (07) (CP (I), I = 1, NCS)
CALL LATDIR (KF, AW, CA, GAMMA, CP, GANVR, VMIC, NA, ZZ, YCP, HALBF, DFJ, TDF)
IC = 1
DO 260 I = 1, LWF
260 CP (I) = GANVR (IP, CP (IC, I))
IF (LAT, NE, 1) 6C TO 270
REWIND 02
REWIND 07
WRITE (07) (CC (I), I = 1, NCS)
WRITE (07) (CP (I), I = 1, NCS)
CALL LATDIR (KF, AW, CA, GAMMA, CP, GANVR, VMIC, NA, ZZ, YCP, HALBF, DFJ, TDF)
IC = 1
DO 260 I = 1, LWF
260 CP (I) = GANVR (IP, CP (IC, I))
IF (LAT, NE, 1) 6C TO 270
REWIND 02
REWIND 07
WRITE (07) (CC (I), I = 1, NCS)
WRITE (07) (CP (I), I = 1, NCS)
CALL LATDIR (KF, AW, CA, GAMMA, CP, GANVR, VMIC, NA, ZZ, YCP, HALBF, DFJ, TDF)
IC = 1
END
In 2003, R. W. Sibson introduced a new method for calculating the ITTISYPKCODE value. The method involves setting a variable TDFJ and using it to determine the final state of the system. The calculations are performed using a series of FORTRAN statements and subroutines. The additional external force effect is considered in the calculations, and the final force is determined by using the FLAP and FINLAY parameters. The resulting force is then used to calculate the final state of the system.
IF (APA.LT.O.) APA=O.
ALPHA=ALPHA+APA
IH=IH*N(W(NA))
CONTINUE
AW(LP1)=ALPHA
CALL VMSEQN (KI, KJ, AW, GAMMA, CA)
IF (KJ.LT.MJ OR KJ.EQ.LAST) GO TO 60
IPHI=IPHI+1
MJ=MJ+NCJ(INK)
CONTINUE
MJ=MJ(J(INK))+1
IF (KJ.EQ.MJ(J(INK))) GO TO 60
GO TO 70
IN=IN+1
IF (KJ.FQ.LJ(JNN)) IPHI=IPHI+1
IF (LI.FQ.LT(100)) GO TO 10
GO TO 40
CONTINUE
IK=IK+1
IF (LI.FQ.LT(100)) GO TO 10
IF (KJ.EQ.LAST) GO TO 11
LI=LI+1
GO TO 12
IF (KI.EQ.LWFJ) GO TO 20
RETURN
C
FNC
SUBROUTINE LATDIR (KF, AW, CA, GAMMA, GAMVR, GAMW, VPLC, NA, YCP, HALFP, LAT)
LAT = 10
DIFJ, TDF, CODE, F10, ATL
LAT = 20
DIMENSION AW(1), CA(1), GAMMA(1), GAMVR(1), GAMW(1), YCP(1)
LAT = 30
COMMON /AERO/ AM1, AM2, FP1, RP, CL(30), CT(30), CD(30), GAM(2, 130)
LAT = 40
COMMON /SCHE/ NCL, NWCING, LAT, NAL, NWF, LWF, LWFJ, CHORDT(3), SNG(5), Y6(5), YCNLAT
LAT = 50
1(1), WNK, RDK, MDF, N6
LAT = 60
COMMON /CONST/ HCS, NCHW, M1(1), NSJ, NJC(1), LAST, MW(3, 130), NWMJ(3, 5), WJ(3, 5)
LAT = 70
IPANEL, MJ(5), NW(3), NJJ, NUP
LAT = 80
COMMON /ADD/ CP(130), CM(30), BREAK(8), SWP(8, 15), ESL(30), ISYM, VMU, VJUL
LAT = 90
1, TFP, FCR, CAMLED, CAMLET, CAMTER, CAMLTE, XJ, YJ, RJ, ALP, CREF, TWRIST
LAT = 100
COMMON /COST/ LTOTAL, LPANI(5), LPANEL, IENTH, LPAR2, EXIT, PTRIAL, TWLAT
LAT = 110
LIST, DF(5), NFP
REWIND 1
IA=2*JPNEL
CAM=CAMFEL
CAM=T=CAMLET
DO 10 I=1,JPNEL
10 GAMMA(I)=GAMMA(I-1)
CAL=GMMAX(AW,CA,JPNEL,GAMMA,N,C,BREAK,SWP,CHORDT,LUPAN2,N,AWLAT)
DO 100 J=1,LWF
100 GAVPA(J)=GAMMA(J)
DO 70 K=1,JPNEL
70 IR=IA
IF (WORK(1).LT.0) GO TO 20
IF (WORK(2).GT.0.0) WORK(2) = 0.0
WRITE (01) (GAMMA(I), I=1,JPNEL)
GAMMA(IP)=GAMMA(IP)+GAMMA(I)
WRITE (08) (CM(I), I=1,NCS)
CALL CMAX (AW,CA,JPNEL,GAMMA,N,C,BREAK,SWP,CHORDT,LUPAN2,N,AWLAT)
DO 100 J=1,JPNEL
100 IR=IA
IF (WORK(1).LT.0) GO TO 20
IF (WORK(2).GT.0.0) WORK(2) = 0.0
WRITE (01) (GAMMA(I), I=1,JPNEL)
GAMMA(IP)=GAMMA(IP)+GAMMA(I)
WRITE (08) (CM(I), I=1,NCS)
CALL CMAX (AW,CA,JPNEL,GAMMA,N,C,BREAK,SWP,CHORDT,LUPAN2,N,AWLAT)
DO 100 J=1,JPNEL
100 IR=IA
CALL GAMAX (MG,CA+LPAN1,LPANEL2,GAMMA,NC,RRFAK,SWP,CHR2CT,LPAN2,NWILAT) 
1NG=10) LAT 610 
IF (J.EQ.2) GO TO 50 LAT 620 
IF (J.EQ.3) GO TO 100 LAT 630 
BET=1., LAT 640 
P=0., LAT 650 
GO TO 100 LAT 660 
RET=0., LAT 670 
CONTINUE LAT 680 
RETURN LAT 690 
END LAT 700 
SUBROUTINE STREAM (ALPHA,VMU,I,IPHI,LPANEL,TEMP,LPAN2,ISYM,KSTR) 
1CODE=EXIT,ISYM,GAMW,FETLZKF,TLM,F10) STR 10 
C TO COMPUTE THE RIGHT HAND SIDE OF THE SIMULTANEOUS EQUATIONS STR 20 
DIMENSION PHIN(300.), GAMW(1) STR 30 
DIMENSION FJS(300), FJA(300), COP(2,30) STR 40 
COMMON /CHEME/ C(2),X(10,41),V(10,41),SLOPE(15),XL(2,15),XT(41) STR 50 
COMMON /SCIHE/ X(10,41),PHIN(1) STR 60 
DIMENSION FJS(300), FJA(300), COP(2,30) STR 70 
COMMON /SCIHE/ X(10,41),PHIN(1) STR 80 
IF (J.EQ.2) WIDTH(8),YCON(25),SWFFP(5A),HALFR,SK(21,8),EX(95,7),TX(95,7) STR 90 
*F(15),PSI(20),CP(95),XV(200),YV(100),SX(8,8),XL(200,2),YH(300,2),ZSTR 100 
COMMON /GEOG/ HALFSW,XCP(200),YCP(200),ZCP(200),XLE(50),YLE(50),XTSTR 110 
COMMON /GEOG/ HALFSW,XCP(200),YCP(200),ZCP(200),XLE(50),YLE(50),XTSTR 120 
COMMON /GEOG/ HALFSW,XCP(200),YCP(200),ZCP(200),XLE(50),YLE(50),XTSTR 130 
COMMON /GEOG/ HALFSW,XCP(200),YCP(200),ZCP(200),XLE(50),YLE(50),XTSTR 140 
COMMON /GEOG/ HALFSW,XCP(200),YCP(200),ZCP(200),XLE(50),YLE(50),XTSTR 150 
COMMON /GEOG/ HALFSW,XCP(200),YCP(200),ZCP(200),XLE(50),YLE(50),XTSTR 160 
COMMON /GEOG/ HALFSW,XCP(200),YCP(200),ZCP(200),XLE(50),YLE(50),XTSTR 170 
COMMON /GEOG/ HALFSW,XCP(200),YCP(200),ZCP(200),XLE(50),YLE(50),XTSTR 180 
COMMON /GEOG/ HALFSW,XCP(200),YCP(200),ZCP(200),XLE(50),YLE(50),XTSTR 190 
COMMON /GEOG/ HALFSW,XCP(200),YCP(200),ZCP(200),XLE(50),YLE(50),XTSTR 200 
COMMON /GEOG/ HALFSW,XCP(200),YCP(200),ZCP(200),XLE(50),YLE(50),XTSTR 210 
COMMON /GEOG/ HALFSW,XCP(200),YCP(200),ZCP(200),XLE(50),YLE(50),XTSTR 220 
COMMON /GEOG/ HALFSW,XCP(200),YCP(200),ZCP(200),XLE(50),YLE(50),XTSTR 230 
COMMON /GEOG/ HALFSW,XCP(200),YCP(200),ZCP(200),XLE(50),YLE(50),XTSTR 240 
COMMON /GEOG/ HALFSW,XCP(200),YCP(200),ZCP(200),XLE(50),YLE(50),XTSTR 250 
COMMON /GEOG/ HALFSW,XCP(200),YCP(200),ZCP(200),XLE(50),YLE(50),XTSTR 260 
COMMON /GEOG/ HALFSW,XCP(200),YCP(200),ZCP(200),XLE(50),YLE(50),XTSTR 270 
COMMON /GEOG/ HALFSW,XCP(200),YCP(200),ZCP(200),XLE(50),YLE(50),XTSTR 280 
COMMON /GEOG/ HALFSW,XCP(200),YCP(200),ZCP(200),XLE(50),YLE(50),XTSTR 290 
COMMON /GEOG/ HALFSW,XCP(200),YCP(200),ZCP(200),XLE(50),YLE(50),XTSTR 300 
COMMON /GEOG/ HALFSW,XCP(200),YCP(200),ZCP(200),XLE(50),YLE(50),XTSTR 310 
COMMON /GEOG/ HALFSW,XCP(200),YCP(200),ZCP(200),XLE(50),YLE(50),XTSTR 320 
COMMON /GEOG/ HALFSW,XCP(200),YCP(200),ZCP(200),XLE(50),YLE(50),XTSTR 330 
COMMON /GEOG/ HALFSW,XCP(200),YCP(200),ZCP(200),XLE(50),YLE(50),XTSTR 340 
COMMON /GEOG/ HALFSW,XCP(200),YCP(200),ZCP(200),XLE(50),YLE(50),XTSTR 350 
COMMON /GEOG/ HALFSW,XCP(200),YCP(200),ZCP(200),XLE(50),YLE(50),XTSTR 360 

IF (L7.NE.0) GO TO 30
ALPHA=ALPS/ALPC*(3,IPHI)*(1.-VMU)
IF (KCODE.EQ.0) ALPHA=0.
IF (TH.LE.0.001) GO TO 40
IF (IPHI.EQ.1) GO TO 40
IF (ISYNEQ.0.AND.IPHIEQ.1) GO TO 40
IF (NNJ.EQ.1.AND.I,GT,LPANEL) ALPHA=ALPHA+CDF*(1.-VMU)
IF (NNJ.EQ.1.AND.I,GT,MJJ(N1)) ALPHA=ALPHA+CDF*(1.-VMU)
GO TO 40

30

ALPHA=(-BET*BK*Y(4,IPHI)+P*YCP(I)/HALFR*Y(3,IPHI),RLOXCP(I)/HALFE*TRANS)

CONTINUE

IF (NPS(B1-B2).LE.0.001) GO TO 50
IF (L7.NE.0) GO TO 50
CALL NCRSPD (I,ALPH,LPANEL,IPHI,LPAN1,LPAN2,KF,NTL,F10)
ALPHA=ALPHA+ALPH

50

IF (KCODE.EQ.0) GO TO 310
IF (EXIT.LE.0.001) GO TO 60
IF (NNJ.EQ.1) GO TO 60
IF (IPHI.EQ.1) GO TO 310
IF (L7.NE.0) GO TO 310
IF (ISYNEQ.0.AND.IPHIEQ.1) GO TO 310
IF (IUSP.EQ.1.AND.ZET.GT.0.01) GO TO 310
IF (CDF.LT.0.000) GO TO 310
IF (NNJ.EQ.1) GO TO 70
IF (I.LF.MJJ(N1)) GO TO 310
IF (IPHI.LT.NJH) IL=IPHI-NH
IF (IPHI.GT.NJH) TL=IPHI-NJJ+ISYP
IF (NNJ.EQ.1) MJNU=KJJ(NJ)
MF=I-MJJ-KJ-(IPPHI-1)*NCJ(KNJ)

70

DICTJ=SCF
DLX=DISTJ*0.5*PI/FKNN'
SZX=(1.-VMU)
IQ=(1.-I)*NCJ(NNJ)
IF (NNJ.EQ.1) IP=LPANEL+IQ
IF (NNJ.EQ.1) IP=KJJ(NI)*IQ+1
GO TO 80

80

DXT=DLY*PSI(JJ)*TFMP*VMU*VMU/TH
GO TO 90

90

JK1=I+JJ
JK2=JK1+1
PRCD=SZX*DXT
JK3=JK2+NCJ(NNJ)
ALPHA=ALPHA+PRCD*(PHI(JK2)-PHI(JK3))
CONTINUE
GO TO 310
CONTINUE
IJ=1-IPANEL
JZ=1
K3=0
K9=0
FAC=1.
IF (KCODE.EQ.0) GO TO 290
IF (FXIT.LE.0.01) GO TO 120
IF (NNJ.EQ.1) GO TO 120
IF (IJ,CT,LPANEL,AND,IJ,LE,MJJ(1)) GO TO 310
CONTINUE
IF (KF.EQ.0) GO TO 170
CALL FSPEED (EI,YCP(IJ),YCP(IJ),ZCP(IJ),CP,WK1,WK2)
AL1=0.
IF (LZ.EQ.0) AL1=F10*WK2
DO 130 LK=1,NTL
 IF (LZ.EQ.0) FFF=CQP(1,LK)
 IF (LZ.EQ.0) FFF=CQP(2,LK)
 KK=LPANEL,LK
 IF (LZ.EQ.0) GA=GAM(1,KK)
 IF (LZ.EQ.0) GA=GAM(2,KK)
130 AL1=AL1+FFF*GA
IF (APS(E1-RP)*LF,0.001) GO TO 150
IF (LZ.EQ.0) GO TO 150
CALL FSPEED (EP,XCP(IJ),YCP(IJ),ZCP(IJ),CP,WK1,WK2)
AL2=0.
IF (LZ.EQ.0) AL2=F10*WK2
DO 140 LK=1,NTL
 IF (LZ.EQ.0) FFF=CQP(1,LK)
 IF (LZ.EQ.0) FFF=CQP(2,LK)
 KK=LPANEL,LK
 IF (LZ.EQ.0) GA=GAM(1,KK)
 IF (LZ.EQ.0) GA=GAM(2,KK)
140 AL2=AL2+FFF*GA
GO TO 160
AL2=AL1
160 ANDT=AL2-TEMP*VMU*VMU*AL1
CONTINUE
IF (IUSR,EQ.1,AND,ZJFT,ET,0.01) GO TO 290
IF (NNJ,EQ.1) GO TO 290
IF (IJ,GT,MJJ(1)) GO TO 290
IF (IPH1,LE,NH) GO TO 290
L1=1-JW
IF (ISYM,EQ.0) L1=KJH+1
IF (NW(3),EQ.0) GO TO 190
IF (NW(3),EQ.0) GO TO IPD
IF (IJ,GT,MJJ(1)) GO TO 240

ORIGINAL PAGE IS
OF POOR QUALITY
IF (IJ.GT.MJJ(K3)) GO TO 220
IF (NNJ.EQ.4) GO TO 200
IF (NNJ.EQ.5.AND.IJ.GT.MJJ(NKJ-4)) GO TO 200
GO TO 290

180 IF (IJ.GT.MJJ(K2)) GO TO 220
IF (NNJ.EQ.3) GO TO 200
IF (NNJ.EQ.4.AND.IJ.GT.MJJ(N3)) GO TO 200
GO TO 290

190 IF (NNJ.EQ.2) GO TO 200
IF (NNJ.EQ.3.AND.IJ.GT.MJJ(N2)) GO TO 200
GO TO 290

200 K1=KJW1(I,NJ)+IPHI-L1-ISYM *NW(1)-1
K2=LC(1)+IPHI-L1-ISYM
KNW=NW(1)
IF (IJ.EQ.MJ) GO TO 250
IF (EXIT.LE.0.01.AND.NW(2).NE.0) GO TO 210
GO TO 250

210 JZ=2
K3=LPANI+(KP-1)*NW(2)
KG=KW(2)
FAC=0.5
GO TO 250

220 K1=KJW1(2,NJ)+IPHI-L1-ISYM *NW(2)-1
K2=LC(2)+IPHI-L1-ISYM
KNW=NW(2)
IF (IJ.EQ.MJ) GO TO 250
IF (APS(FXIT-1.).LE.0.001.AND.NW(2).NE.0) GO TO 230
GO TO 250

230 JZ=2
K3=LPANI2+(K2-1)*NW(3)
KG=KW(3)
FAC=0.5
GO TO 250

240 K1=KJW1(3,NJ)+IPHI-L1-ISYM *NW(3)-1
K2=LC(3)+IPHI-L1-ISYM
KNW=NW(3)
CONTINUE

ALPHA1=0.
ALPHA2=0.
DO 280 JL=1,JZ
DO 270 KK=1,KW
KL=KI+KK
AA=1.
DO 260 L=1,KW
LL=KI+L
IF (L.EQ.KK) GO TO 260
AA=AA*(XCP(IJ)-XV(LL))/(XV(KL)-XV(LL))
260 CONTINUE

CONTINUE
IF (LZ.EQ.0) GA=GA(1,KL)
IF (LZ.NE.0) GA=GWA(KL)
    STRIP70
IF (LZ.EQ.0) GA=GAW(2,KL)
    STRIP80
ALPPA2=ALPHA2+AA*GA
    STRI89O
CONTINUE
    STRI900
KNw=K0
    STRI910
K1=K3
    STRI920
ALPHA1=ALPHA1*FAC
    STRI930
ALPHA2=ALPHA2*FAC
    STRI940
IF (ABS(R1-B2) .LE. 0.001) ALPHA2=ALPHA1
    STRI950
ALPA=(ALPHA2-TEMPE*VMU*VMU*ALPHA1)*O.5+ADPT
    STRI960
GO TO 310
    STRI970
CALL SPFED (VMU,ALPHA,LPANI,TEMPE,LPAN2,PHIS,IPHI,ISYM,GAM)
    STRI990
IF (KCODE .NE.0) CC
    STP2020
IF (CDF .LT. 0.0001) GO TO 310
    STR2030
IF (NNJ .EQ. 1) GO TO 300
    STR2040
IF (IJ .GE. MJ+NM) GO TO 310
    STR2050
PHIN(IJ)=PHIS
    STR2060
CONTINUE
    STR2070
RETURN
    STR2080
C
ENC
SUPROUTINE GANAX (AW,CA,LPANEL,TEMPE,LPAN1,LPAN2,PHIS,IPHI,ISYM,GAM)
    STR2100
DIMENSION AW(1), CA(1), GAMMA(1), BREAK(1)
    GAM 20
DIMENSION SWP(P,15)
    GAM 30
DIMENSION G(10), CHORDT(1)
    GAM 40
DIMENSION A(15), F(15), THETA(15)
    GAM 50
COMMON /AERO/ AM2,B1,P2,CL(30),CT(30),CD(30),GAM(2,130)
    GAM 70
COMMON /GEO/ HALF, XCP(200), YCP(200), XLE(50), YLE(50)
    GAM 80
IF (F).PSI(20), CH(95).XV(200), YV(100), SN(8,8), XA(200,2), YA(200,2), ZGA
    GAM 90
2N(P00,2), WIDBT(8), YCON(25), SWEEP(E0), HALFR, SJ(21,8), EX(952), TX(952)
    GAM 100
3+?5, 8C(160,5), S?1(160,5), LC(3)
    GAM 110
COMMON /CONST/ KCS,NCW,K1(P), SJ, CJ(5), LAST, MJW(3,5), MJP(3,5), JGA
    GAM 120
LPANEL, MJUJ(5), VW(3), NJJ, NJP
    GAM 130
PI=3.14159265
    GAM 140
DO 80 I=1, NCS
    GAM 150
NA=1
    GAM 160
NK=(I-1)*NW(1)
    GAM 170
SUM=0
    GAM 180
NW=NW(1)
    GAM 190
ISH=1
    GAM 200
FN=NW(1)
    GAM 210
N1=NWW(+1)
    GAM 220
DO 20 J=1,NWW
KK=KK+J
FJ=J
THETA(J)=(2.*FJ-1.)*PI/(2.*FN)
F(J)=GAMMA(KK)*SN(J,ISN)
20 CONTINUE
THETA(N1)=PI
DO 40 J=1,N1
A(J)=0.
FJ=J
DO 30 K=1,NW
A(J)=A(J)+F(K)*COS((FJ-1.)*THETA(K))
IF (J.EQ.1) A(J)=A(J)/FN
IF (J.NE.1) A(J)=A(J)*2./FN
30 CONTINUE
DO 60 K=1,N1
KK=KK+K
SUM=A(1)*TFTA(K)
DO 50 J=1,NWW
SU=SUM*A(J+1)*SIN((FJ+TFTA(K))/FJ)
I7=I
IF (NA.EQ.2) I7=I+1
IF (NA.EQ.3) I7=I+2
SUM=-SUM+CH(I7)*SUM
50 CONTINUE
A(KK)=SUM
60 CONTINUE
DO 65 J=1,N1
IF (NA.EQ.2) NK=LPAN1+(I-1)*NW(2)
IF (NA.EQ.3) NK=LPAN2+(I-1)*NW(3)
ISH=ISP+1
65 CONTINUE
GO TO 70
70 CONTINUE
80 CONTINUE
NK1=0
NK2=LPAN1
NK3=LPAN2
DO 250 I=1,NC
HAP=HALFB
M=MI(I)
FM=F
MM=MM-1
DO 90 J=1,NW

ORIGINAL PAGE IS OF POOR QUALITY
FJ=J
YCCN(J)=COS(FJ*PI/FP)
Y=0.5*WIDTH(I)*((1.-YCCN(J))*BREAK(I)
DO 230 J=1,NCW
G(J)=0.
IF (J.GT.NW(1)) CC TO 100
NK=NK1
LK=0
IR1=I
JJ=J
MK=AW(1)
GO TO 120
100 IF (J.GT.(NW(1)+NW(2))) GO TO 110
NK=NK2
MK=AW(3)
LK=AW(1)+NW(2)
IR1=I+2*NC
JJ=J-NW(1)-NW(2)
GO TO 120
110 NK=NK3
MK=AW(3)
LK=AW(1)+NW(2)
IR1=I+2*NC
JJ=J-NW(1)-NW(2)
L1=MK+J-LK
L2=L1+MK
L3=L2+MK
SP=SWP(JJ+IR1)
CS=COS(SP)
TAN=SIN(SP)/CS
SM=0.
DO 140 LO=1,MK
LP=L1+(LO-1)*MK
AA=1.
DO 130 LS=1,MK
LN=L1+(LS-1)*MK
IF (LS.EQ.LO) GO TO 130
AA=AA*(BREAK(I)-YCP(LN))/(YCP(LP)-YCP(LN))
130 CONTINUE
SM=SM+AA*AW(LP)*PSI(LQ)
GAMA0=SM
IF (I.EQ.NC) GO TO 170
SM=0.
DO 160 LO=1,MK
LP=L1+(LO-1)*MK
AA=1.
DO 150 LS=1,MK
LN=L1+(LS-1)*MK
IF (LS.EQ.LQ) GO TO 150
AA=AA*(BREAK(I+1)-YCP(LN))/(YCP(LP)-YCP(LN))
150 CONTINUE
160 SM=SM+AA*AW(LP)*PSI(LQ)
GAMAN=SM
GO TO 180
170 GAMAN=0.
180 DO 210 K=1,MW
LL=KK+(K-1)*MK+J-LK
CA(LL)=0.
DO 200 KK=1,MW
L=KK+(KK-1)*MK+J-LK
IF (KK.EQ.1) GO TO 190
CA(LL)=CA(LL)+2.*(1.)*KK*AA*(LI)*PSI(KK)/(WIDTH(I)*(YCON(KK)-YCP(LN)))
GO TO 200
190 CA(LL)=CA(LL)*AW(LL)*PSI(K)*YCON(KK)/(WIDTH(I)*SJ(K)+SJ(K+I))
200 CONTINUE
CA(LL)=CA(LL)+GAMAC*(-1.)*KK*AA*(LI)*PSI(KK)/(WIDTH(I)-GAMAC*(-1.)*KK*AA*(LI)*PSI(KK))
CA(LL)=CA(LL)*PSI(K)
IF (J.EQ.NC) GO TO 210
G(J)=G(J)*A+W(1)*PSI(K)*(-1.)*KK/K+YCON(KK))
210 CONTINUE
CA(LL)=TAMAC(LM(LL)+CA(LL)
CA(LL)=CA(LL)+GAMAC*(-1.)*KK*AA*(LI)*PSI(KK)/(WIDTH(I)-GAMAC*(-1.)*KK*AA*(LI)*PSI(KK))
CA(LL)=CA(LL)*PSI(K)
IF (J.EQ.NC) GO TO 220
GO TO 230
220 CONTINUE
CA(LL)=CA(LL)*A+W(1)*PSI(K)*(-1.)*KK*AA*(LI)*GAMAC/(WIDTH(I)
CA(LL)=CA(LL)*A+W(1)*PSI(K)*(-1.)*KK*AA*(LI)*GAMAC/(WIDTH(I)
CL(J)=G(J)
G(J)=G(J)*SQRT(HAP)/2.*R*427124
NK2=LL
230 CONTINUE
IF (KZ.EQ.0) WRITE (07) (CL(J),J=1,NK2)
GO TO 240
240 CONTINUE
IF (KZ.EQ.0) WRITE (07) (CL(J),J=1,NK2)
GO TO 250
250 CONTINUE
END
SUPROUTINE LATFRL (GAMMA,AW,CA,LPANEL,LPANI,LPAN2,LF,W,DF,VAL,SNG,YLR)
DIMENSION GAMMA(1), AW(1), CA(1), DF(1), SNG(1), YG(1)
COMMON /GEOM/ HALFSX,XCP(20),YCP(20),ZCP(20),XLE(50),YLE(50),XTLRL
DIMENSION LRL 20
DIMENSION GAMMA(1), AW(1), CA(1), DF(1), SNG(1), YG(1)
COMMON /GEOM/ HALFSX,XCP(20),YCP(20),ZCP(20),XLE(50),YLE(50),XTLRL
DIMENSION LRL 20
\begin{verbatim}
3,2,SC(160,5),SI(160,5),LC(3)
COMMON /CONST/ NSC,NCW,MI(8),NSJ,NCJ(5),LAST,HW1(3,5),HW2(3,5),JLRL
IPANEL,HJ(5),KW(3),NNJ,NJP
COMMON /FUS/ XF(20),XCF(20),PF(20),SNP(5,20),XEF,XTEF,WARD(20),NCLRL
LUM,SF,NT,CSF(5,10),XAS(6),NKF(5),F0,F10,KF,NTL
L1=LWF+1
REWIND 04
PI=3.14159265
SK=SNGL(1)
BK=5.*PI/180.
READ (04) (AW(I),I=IL1) (AW(I+1),I=IL2)
AW(L1)=P*YCP(1)/HALFB*PK*PET=RL*XCP(1)/HALFB*SK
WN=0.*
IF (KF.EQ.0) GO TO 10
X=XCP(1)
Y=YCP(I)
Z=ZCP(1)
WK=0.*
G=0.*
CALL FUSVOL (E,X,Y,Z,WN,WK,G,11)
AW(L1)=AW(L1)+WK
GAMPA(I)=-AW(1+1)/AW(1)
NJ=LWF+1
MY=WN(I)
NN=WN(I)
KW=1
Z=1
DO 20 IJ=2,LWF
READ (04) (AW(K),K=I,1,IL1)
IF (IJ.LE.LPANEL) GO TO 30
I=IJ+LPANEL
AW(L1)=0.*
IF (IJ.GT.NF) GO TO 70
AW(L1)=(-BK*PET=RL*XCF(I)/HALFB)*RF(I)*PF(I)
GO TO 70
IF (YCP(IJ).GT.YCP(I)) GO TO 40
GO TO 50
KW=KW+1
SK=SNGL(KW)
AW(L1)=P*YCP(IJ)/HALFB*PET*PK*SK=RL*XCP(IJ)/HALFB*SK
WN=0.*
IF (KF.EQ.0) GO TO 60
X=XCP(IJ)
Y=YCP(IJ)
Z=ZCP(IJ)
CALL FUSVOL (E,X,Y,Z,WN,WK,G,11)
AW(L1)=AW(L1)+WN
IK=IJ
LRL 70
LRL 80
LRL 90
LRL 100
LRL 110
LRL 120
LRL 130
LRL 140
LRL 150
LRL 160
LRL 170
LRL 180
LRL 190
LRL 200
LRL 210
LRL 220
LRL 230
LRL 240
LRL 250
LRL 260
LRL 270
LRL 280
LRL 290
LRL 300
LRL 310
LRL 320
LRL 330
LRL 340
LRL 350
LRL 360
LRL 370
LRL 380
LRL 390
LRL 400
LRL 410
LRL 420
LRL 430
LRL 440
LRL 450
LRL 460
LRL 470
LRL 480
LRL 490
LRL 500
LRL 510
LRL 520
LRL 530
LRL 540
LRL 550
\end{verbatim}
CALL VMSEON (NJ, IK, AW, GAYA, CA)
NJ=N-1
IF (IJ*GE.LPANL.AND.IJ*LT.LPANL) NN=NW(2)
IF (IJ*GE.LPAN2.AND.IJ*LT.LPAN2) NN=NW(3)
IF (IJ*LT.MM) GO TO 80
MM=MM+NN
IJ=IJ+1
80 IF (IJ*EQ.LPANL.OR.IJ*EQ.LPAN2) IZ=1
IF (IJ*EQ.LPANL.OR.IJ*EQ.LPAN2) KW=1
90 CONTINUE
P=RETURN
P=RETURN
C END
SUPPOTINE INDVL (XD,Y,J2,XJ,YJ2,J,K2,PHIM,PHXM,TS,L,PH,SYM)
TO COMPUTE THE INDUCED VELOCITIES DUE TO JET ENTRAINMENT
DIMENSION VZ(2), VX(2), VY(2)
COMMON /JET/ PK1,XC1,X(31),A(31),P(31)
RFJ=T
VZ(2)=0.
VX(2)=0.
VY(2)=0.
SPJ=SOR(REJ)
XR=(XD-XJ)/R
NCC=TSYM+1
DO 40 K=1,NCC
IF (K,FJ,1) FC=1.
IF (K*EQ.2) FC=-1.
RP=SOR((X2-J2)**2+(Y2-J2)**2)/RJ
F1=SOR((X-B)*X2+R2*PP)+RP)
F2=SOR(((XR)**2+R2*RP*PP)
G10=(XB-XC)/F1+XP/F2
G20=1./F1+1./F2
SUPR=(A(1)*E(1)*XP)?10/PP-R2*RP*P(1)*G20
SUPX=(A(1)*R(1)*XB)*G20-E(1)*G1*E(XB-XC+F1)/(XE+F2))
IF (UJ,LE,0.01) FC TO 20
IF (UJ,LE,0.01) FC TO 20
J=2
10 SUM1=SUM
SUM2=SUMX
F1=SOR(((XR)**2+B2*RP*PP)
F2=SOR(((XR)**2+B2*RP*PP)
G1=(XR-X(J))/F1-(XE-X(J-1))/F2
G2=1./F1-1./F2
SUPR=(A(J)+R(J)*XP)*G1/PP-R2*RP*P(J)*G2
SUPX=SUPX+(A(J)+R(J)*XP)*G2-R(J)*G1*R(J)*ALOG((XB-XC+F1)/(XE+F2))
IF (J,LE,31) GO TO 30
J=J+1
30 GO TO 10
20 SUPR=SUPR+0.52*(1.*(XP-XC)/F1)/PP

ORIGINAL PAGE IS
OF POOR QUALITY
30 SUMX=SLMX*0.32/F1

40 VX(K)=PHX/2.

60 PHY=VY(1)+VY(2)

PHX=VX(1)+VX(2)

RETURN

C

END

SUBROUTINE SPEFD (VMU, IALPHA, LPANEL, TEMP, LPAN1, LPAN2, PHIS, IPHI, ISSPD)

1Y=GMW(1)

C TO COMPUTE THE INDUCED TANGENTIAL VELOCITIES DUE TO WING ALONE

C VORVICES

DIMENSION SU(100), GMW(1)

COMMON /SCHEME/ C(2), X(10, 41), Y(10, 41), SLOPE(15), XI(2, 15), XTI(41)

COMMON /GEOM/ HALFSXCP(200), YCP(200), ZCP(200), XLE(50), YL(50), XTS

COMMON /AERO/ AW1, AP2, PI, P2, CL(30), CT(30), CD(30), GAM(2130)

COMMON /CONST/ NCS, NCW, W(1), NSJ, NCJ(5), LAST, JW1(3, 5), JW2(3, 5)

DO 70 J=1, LPANEL

J=J-1

J=J+1

CONTINUE

C

GO TO 30

NL=MW(2)

ORIGINAL PAGE IS OF POOR QUALITY
IF (J,GE,LPAN2,AND,J,LT,LPANEL) NL=NW(3)

30 CONTINUE

X1=XN(J+1)-XCP(II)
X2=XN(J+2)-XCP(II)
X12=XN(J,2)-XN(J,1)
Y12=YN(J,2)-YN(J,1)
Z1=ZN(J,1)-ZCP(II)
Z2=ZN(J,2)-ZCP(II)
X7J=X1+Z12-Z1*X12
D0 60 K=1+2
IF (K,GT,4) GO TO 40
N=1

40 CONTINUE

YC=(-1.)**N*YCP(II)
Y1=YN(J,1)-YC
Y2=YN(J,2)-YC
XYK=XYK+XZJ*Y12-Y1*XI2
ZYJ=Y1*Z12-Z1*Y12

ALP1=XYK*XYK+XZJ*Y2+PR*YZ1*Y7I
P1P1=SORT(X*Y+PR*Y2*Y2+PB*Z2*Z2)

1) /R1P1
F1=UUP1*Y7I/ALB1
IF (LZ.EQ.0) GA=GA+IC,J
IF (LZ.NF.0) GA=GA+MW(J)
SU=FI*CH(I)*SH(J,J*ISN)*GA/FN
IF (K,LT,1) SU(J)=FI*CH(I)*SH(J,J*ISN)/FN

60 CONTINUE

IF (J,LT,NM) GO TO 70

70 CONTINUE

IF (NSJ,.EQ.0) NJH=NSJ/2
IF (IPHI,.EQ.,NH) GO TO 140
IF (ISYM,.NE.0,.AND.,IPHI,.GT.0) GO TO 140
IF (NNJ,.EQ.1) GO TO 140
IF (IIP,.GT.,NH) GO TO 140
IF (IPHI,.GT.,NH) L1=NJH
IF (ISYM,.EQ.0,.AND.,IPHI,.GT.,NH) L1=NJH+1
IF (IPHI,.GT.,NH) L1=I
IF (ISYM,.EQ.0,.AND.,NW(3),.EQ.0) KZ=2

SPD 370
SPD 380
SPD 390
SPD 400
SPD 410
SPD 420
SPD 430
SPD 440
SPD 450
SPD 460
SPD 470
SPD 480
SPD 490
SPD 500
SPD 510
SPD 520
SPD 530
SPD 540
SPD 550
SPD 560
SPD 570
SPD 580
SPD 590
SPD 600
SPD 610
SPD 620
SPD 630
SPD 640
SPD 650
SPD 660
SPD 670
SPD 680
SPD 690
SPD 700
SPD 710
SPD 720
SPD 730
SPD 740
SPD 750
SPD 760
SPD 770
SPD 780
SPD 790
SPD 800
SPD 810
SPD 820
SPD 830
SPD 840
SPD 850
IF (NW(3).NE.0) K7=3 SPD 860
IF (NNJ.LE.3.AND.NW(2).NE.0) IR=N2 SPD 870
IF (NNJ.GE.4.AND.NW(3).NE.0) IR=N3 SPD 890
DO 110 MP=1,N7
K1=M(JI+1,MP)+(IPHI-LI-ISYN)*NW(MP)-I

g00 130 MP=1,N7
KI=KI+1
K2=K2+1
MR=2
DO 120 MP=1,MR
SUM=0.
DO 90 KK=1,KW
KL=KJ+KK
90 SUM=SUM*SUM(KL)
CALL INTEG (RES*KNW,K1,KP,IP,IR)
COPH=0.
DO 110 KK=1,NW
KL=KJ+KK
AA=1,
DO 100 L=1,KW
LL=KL+L
IF (L.EQ.KK) GO TO 100
AA=AA*(XCP(Il)-XV(LL))/(XV(KL)-XV(LL))
100 CONTINUE
IF (LZ.LE.0) GA=GAW(IC,KL)
IF (LZ.NE.0) GA=GAW(KL)
110 COPH=COPH+AA*GA
B=E-COPH*SUM+COPH*RES*8.
K1=KJ+KNW
K2=K2+1
120 CONTINUE
IR=IR+1
130 CONTINUE
140 CONTINUE
IF (IC.EQ.2) GO TO 150
ALPHA1=P/P.
150 ALPHA2=P/P,
GO TO 10
ALPHA2=ALPHA1
ALPHA=ALPHA2-TEIPVMU*VMU*ALPHA
PHIS=ALPHA2
RETURN

END

SUBROUTINE NORSPD (I,ALPHALPANEL,IPHI,LPAN1,LPAN2,KF,NTL,F10)

TO COMPUTE THE INDUCED NORMAL VELOCITIES DUE TO WING ALONE

VORTICES

DIMENSION AW(30), BW(30)
COMMON /SCHEME/ C(2),X(10,41),Y(10,41),SLOPE(15),XL(2,15),XTT(41)
COMMON /GEON/ HALFW,XCP(200),ZCP(200),XLE(50),YLE(50),XTNRD
1E(50),PSI(20),CH(95),XV(200),YN(100),SN(8,8),X(200,2),YN(200,2),ZNRD
2N(200,2),WIDTH(8),YCON(25),SWEEP(50),HALFR,SL(21,8),EX(95,2),TX(95NRD
3,2),SC(160,5),SI(160,5),LC(3)
COMMON /AERO/ AP1,AP2,EP1,EP2,CL(30),CT(30),CD(30),GAM(2,130)
COMMON /CONST/ NCW,NCW1(8),NSJ,NCJ(5),LAST,WMW(3,5),WMW2(3,5),JNRD
1PANEL,MUJ(5),NW(3),NRJ,NJP

DO PO J=1,LPANEL
JJ=J-MM
FN=1-MM
IF (J.EQ.(LPAN1+1).OR.J.EQ.(LPAN2+1)) IP=1
IF (J.GT.LPAN1.AND.J.LE.LPAN2) ISN=2
IF (J.GT.LPAN2.AND.J.LE.LPANEL) ISN=3
IF (J.GE.LPAN1.AND.J.LE.LPANEL) GO TO 10
GO TO 20
GO TO 10

10 NL=NW(2)
IF (J.GT.LPAN2.AND.J.LE.LPANEL) NL=NW(3)
CONTINUE

X1=XN(J,1)-XCP(I)
X2=XN(J,2)-XCP(I)
X12=XN(J,2)-XN(J,1)
Y1=YN(J,1)-YN(J,1)
Y12=YN(J,2)-YN(J,1)
Z1=ZN(J,1)-ZCP(I)
Z2=ZN(J,2)-ZCP(I)
XJZ=XJ*Z12-Z1*X12
DO 70 K=1,2
IF (K.EQ.1) GO TO 30

END
N=1
GO TO 40
N=2
40 CONTINUE

Y*=(-1)**N*YCP(I)
Y1=YN(-1)-YC
Y2=YN(J+2)-YC
XYK=X1*Y12-Y1*X12
Y7I=Y1*Z12-Z1*Y12
ALP1=XYK*XYK*Y7*XY7*Y7*I
R1E1=SORT(X1*Y1+Y1*X1+Y1*Z1+Z1*Y1)
R2P1=SORT(X2*Y2+Y2*X2+Y2*Z2+Z2*Y2)

GO TO 60
50 G1=2.0-X1/R1P1/(Y1*Y1+Z1*Z1)
G2=2.0-X2/R2P1/(Y2*Y2+Z2*Z2)
K1=2.0-G1-71*G1
G1=2.0-G2+72*G2
IF (I1.EO.I.AND.KF.NE.0) CC 
GO TO 60

G3=2.0-X1/R1P2/(Y1*Y1+Z1*Z1)
G4=2.0-X2/R2P2/(Y2*Y2+Z2*Z2)
F1=2.0*X1P1*XZ1/ALP1
F12=UU1*XYK/ALP1
F2=2.0*X2P1*XZ1/ALP1
F22=UU1*XYK/ALP2
G23=2.0-G4+12*G3
G23=2.0-G2+12*G2
IF (I1.EO.I.AND.KF.NE.0) CC 
GO TO 50

G1=2.0-G2+12*G1
G1=2.0-G2+12*G2
IF (I1.EO.I.AND.KF.NE.0) CC 
GO TO 60

CONTINUE

F1=2.0*Y(4+IPHI)*(-1)**N*F1P2*Y(3+IPHI)
F2=2.0*Y(4+IPHI)*(-1)**N*G12*Y(3+IPHI)
F3=2.0*Y(4+IPHI)*(-1)**N*F2P2*Y(3+IPHI)
F4=2.0*Y(4+IPHI)*(-1)**N*G22*Y(3+IPHI)
A1=A1+(F1+F2)*C(H1Z1)*SN(I1,S1A)*GAM1(J1)/F1
A2=A2+(F3+F4)*C(H1Z1)*SN(I1,S1A)*GAM2(J2)/F2
IF (J1.LT.NM.P1+J2.P1+L PANEL) CC TO 90
IZ=IZ+1
IP=IP+1
MM=MM
NM=NM+NL
CONTINUE
IF (KF.EQ.0) GO TO 110
CALL UNWF (B1,XCP(I),YCP(I),ZCP(I),AW,BW,IPHI,1,AL1,0)
A1=A1+AL1*F10*P
DO 90 K=1,NTL
KK=K+LPANEL
A1=A1+AW(K)*GAM(1,KK)*8.
CALL UNWF (B2,XCP(I),YCP(I),ZCP(I),AW,BW,IPHI,1,AL2,0)
A2=A2+AL2*F10*P
DO 100 K=1,NTL
KK=K+LPANEL
A2=A2+AW(K)*GAM(2,KK)*8.
CONTINUE
ALPH=(A1-A2)/P
RETURN
END

SUBROUTINE FALONE (FCSA,W.CA(FA),CAPP)
DIMENSION AW(I),CA(I),CA(5MAC)
COMMON /FUS/ XF(20),XCF(20),PF(20),SNP(5,20),XLEF,XTEF,XF,ARD(20),XCLL
1=0
PI=3.14159265
NF=NT
I=1
XS=XCF(IJ)-XTEF
IF (I.EQ.NF) PFL=0.
IF (I.NE.NF) PFL=XCF/PFT(XS*XS*P*PF(IJ))
CALL FUSELA (KI,AW,N,IJXAS,XTFF,XF.XCF,P,SN,P
1=1,NF
DO 20 I=1,NF

X=I
XS=XCF(IJ)-XTEF
IF (I.EQ.NF) RFL=0.
IF (I.NE.NF) RFL=XS/SRT(XS*XS+R*PF(IJ))
CALL FUSELA (I,AH,N,IJXAS,XTFF,XF.XCF,P,SN,P
YD=XCF(IJ)
XEF=XCF(IJ)-XLEF
AW(NF)=-SLOP(Y)*CS-(RFL-XEF)^0.5/(4*PI)
IF (I.NE.1) GO TO 20
I=I+1
GOTO 20
CONTINUE
DO 40 I=1,NF
WRF(I)=GAMMA(I)
RETURN
END

SUBROUTINE THRFCT (LTFOR,LPANN,GMAT,GMAT,CA,LPANN,VMUX,JYX,JUTHR
C
END
1. To evaluate the leading edge thrust:

2. Dimension: \( \Gamma(I), GAL(I), GAMW(I), SNG(I), YG(I) \)

3. Common /Scheme/: \( C(2), X(10,11), Y(10,11), SLOPE(15), X(12,15), XTT(41) \)

4. 1XLL(41)

5. Common /geom/: \( HAFSWY, XCP(200), YCP(200), ZCP(200), XLE(50), YLE(50), XTH(50) \)

6. Dimension: \( \Gamma(I), GAL(I), GAMW(I), SNG(I), YG(I) \)

7. Common /scheme/: \( C(2), X(10,11), Y(10,11), SLOPE(15), X(12,15), XTT(41) \)

8. 1XLL(41)

9. Common /geom/: \( HAFSWY, XCP(200), YCP(200), ZCP(200), XLE(50), YLE(50), XTH(50) \)

10. Dimension: \( \Gamma(I), GAL(I), GAMW(I), SNG(I), YG(I) \)

11. Common /scheme/: \( C(2), X(10,11), Y(10,11), SLOPE(15), X(12,15), XTT(41) \)

12. 1XLL(41)

13. Common /geom/: \( HAFSWY, XCP(200), YCP(200), ZCP(200), XLE(50), YLE(50), XTH(50) \)

14. Dimension: \( \Gamma(I), GAL(I), GAMW(I), SNG(I), YG(I) \)

15. Common /scheme/: \( C(2), X(10,11), Y(10,11), SLOPE(15), X(12,15), XTT(41) \)

16. 1XLL(41)

17. Common /geom/: \( HAFSWY, XCP(200), YCP(200), ZCP(200), XLE(50), YLE(50), XTH(50) \)

18. Dimension: \( \Gamma(I), GAL(I), GAMW(I), SNG(I), YG(I) \)

19. Common /scheme/: \( C(2), X(10,11), Y(10,11), SLOPE(15), X(12,15), XTT(41) \)

20. 1XLL(41)

21. Common /geom/: \( HAFSWY, XCP(200), YCP(200), ZCP(200), XLE(50), YLE(50), XTH(50) \)

22. Dimension: \( \Gamma(I), GAL(I), GAMW(I), SNG(I), YG(I) \)

23. Common /scheme/: \( C(2), X(10,11), Y(10,11), SLOPE(15), X(12,15), XTT(41) \)

24. 1XLL(41)

25. Common /geom/: \( HAFSWY, XCP(200), YCP(200), ZCP(200), XLE(50), YLE(50), XTH(50) \)

26. Dimension: \( \Gamma(I), GAL(I), GAMW(I), SNG(I), YG(I) \)

27. Common /scheme/: \( C(2), X(10,11), Y(10,11), SLOPE(15), X(12,15), XTT(41) \)

28. 1XLL(41)

29. Common /geom/: \( HAFSWY, XCP(200), YCP(200), ZCP(200), XLE(50), YLE(50), XTH(50) \)

30. Dimension: \( \Gamma(I), GAL(I), GAMW(I), SNG(I), YG(I) \)

31. Common /scheme/: \( C(2), X(10,11), Y(10,11), SLOPE(15), X(12,15), XTT(41) \)

32. 1XLL(41)

33. Common /geom/: \( HAFSWY, XCP(200), YCP(200), ZCP(200), XLE(50), YLE(50), XTH(50) \)

34. Dimension: \( \Gamma(I), GAL(I), GAMW(I), SNG(I), YG(I) \)

35. Common /scheme/: \( C(2), X(10,11), Y(10,11), SLOPE(15), X(12,15), XTT(41) \)

36. 1XLL(41)

37. Common /geom/: \( HAFSWY, XCP(200), YCP(200), ZCP(200), XLE(50), YLE(50), XTH(50) \)

38. Dimension: \( \Gamma(I), GAL(I), GAMW(I), SNG(I), YG(I) \)

39. Common /scheme/: \( C(2), X(10,11), Y(10,11), SLOPE(15), X(12,15), XTT(41) \)

40. 1XLL(41)

41. Common /geom/: \( HAFSWY, XCP(200), YCP(200), ZCP(200), XLE(50), YLE(50), XTH(50) \)

42. Dimension: \( \Gamma(I), GAL(I), GAMW(I), SNG(I), YG(I) \)

43. Common /scheme/: \( C(2), X(10,11), Y(10,11), SLOPE(15), X(12,15), XTT(41) \)

44. 1XLL(41)
WN=0
KP=1+(I-1)*NW(I)
IF (KF,FG,0) GC TC 60
XO=XL(E(I))
YO=YLE(I)
ZO=ZCP(KP)
IP=1
CALL UNWF (R1, XO, YO, ZO, AW, BW, TPHI, 0, WK?, 0)
DO 50 IP=1, NTL
IO=IP+LPANEL
IF (KZ,FG,0) GC TC 40
A=A+AW(IP)*GAM(1*IQ)*R*
PC=PC+AW(IP)*GAM(2*IQ)*F*
GO TO 50
PC=PC+AW(IP)*GAM(2*IQ)*F*
GO TO 50
CONTINUE
60 CONTINUE
DO 150 NN=1, LPANEL
L=NN
IF (KZ,FG,0) GAM=GAM(W(NN))
IF (KZ,NE,0) GAM=GAM(2*NN)
J=NN-1
FN=NL
IF (NN,EO,(LPAN1+1), OR,NN,EO,(LPAN2+1)) IS=1
IF (NN,GE,LPAN1, AND,NN,LT,LPANFL) GO TO 70
GO TO 80
70 NL=NN(2)
IF (NN,GE,LPAN2, AND,NN,LT,LPANFL) NL=NW(3)
IF (NN,GT,LPAN1, AND,NN,LE,LPAN2) TSN=2
IF (NN,GT,LPAN2, AND,NN,LE,LPANFL) TSN=3
P0 CONTINUE
X1=XN(NN+1)-XLF(I)
X2=XN(NN+2)-XLF(I)
X12=XN(NN+2)-XH(1)
Y12=YN(NN+2)-YA(1)
Z12=ZN(L+1)-ZA(L+1)
Z1=ZN(L+1)-ZCP(KP)
Z2=ZN(L+2)-ZCP(KP)
X7J=X1*Z1=Z1*Y1*
FCP=1
DO 140 K=1,2
IF (KZ,EG,0, AND, K, EG, 2) FCP=-1.
IF (KZ,EG,1) GC TO 90
N1=1
GO TO 100
90 N1=2
100 CONTINUE
YC=YLE(I)*(-1.)*N1
Y1=YN(NN+1)-YC
Y2 = YM(NM+2) - YC
XYK = X1*Y12 + Y1*X12
YZI = Y1*Z12 - Z1*Y12
ALB1 = XYK*XYK + XZJ*XZJ + B1*YZI*YZI
R2B1 = SQRT(X1*X1 + R1*Y1 + R1*Z1 + Z1)
R2B1 = SQRT(X2*X2 + P1*Y2 + P1*Z2 + Z2)
UP1 = (X2*X1 + B1*Y12 + B1*Z2 + Z2)/P2B1 - (X1*X12 + P1*Y1 + P1*Z12)

IF (IS.EQ.1.AND.KF.NE.0) GO TO 120
CONTINUE

G1P1 = (1. - X1/R1P1)/(Y1*Y1 + Z1*Z1)
GO TO 130

IF (KZ.EQ.0) GO TO 110
G1P1 = 0.

G2P1 = (1. - X2/R2P1)/(Y2*Y2 + Z2*Z2)
F1 = UP1*XYK/ALB1
F2 = Y2*G2P1 + Y1*G1P1
PC = PC + (F1 + F2)*SH(J*IN)@G1W@CH(I7)/FN*FCP
IF (KZ.EQ.0) GO TO 140
A = A + (F1 + F2)*SH(J*IN)@G1W@CH(I7)/FN
CONTINUE

IF (NN.LT.NM+1) GO TO 150
IS = IS + 1
IZ = NZ + 1
NP = NP + 1
CONTINUE

IF (KZ.EQ.0) GO TO 160
CAM = CAMER = (CAMER - CAMLET)*YLM(I)/HALFR
ALP = ALP = ALP + YLM(I)
CONTINUE

IF (KF.EQ.0) GO TO 170
WK = WK + 1
CALL FUSVOL (B1, XG, YG, 70, WN + 1, WP)

CONTINUE

IF (KZ.EQ.0) MP = 1

CONTINUE

IF (YLM(I) + GT.YE(KW)) GO TO 180
GOTO 190

CONTINUE

A = A + ALP = ALP + WN
XB=XLE(I)
YP=YLF(I)
ZR=ZCP(KP)
PHRV=0.
IF (IUSB.EQ.1.AND.ITN.EQ.0) GO TO 210
CALL INVEL (XP,YP,ZB,YJ,ZJ,PI,PHRV,PHX,T,VMU,P,Y,ISYP)
210 CONTINUE
A=A*PHRV/(ALPC*VML)
A=A*SRT
THR1=A/(CN*SQT(FTAN*FTAN+BB))
IF (K7.EQ.0) GO TO 220
XTE(I)=(PI/2.)*SQT(I-AM1*AM1*FCOS*FCOS)*THR1*THR1/FCOS
220 CONTINUE
BC=BC/8.+ALPT-CAMLE*WN
BC=BC*SRT
THR=BC/(CN*SQT(FTAN*FTAN+BP))
CM(I)=THR
IF (K7.EQ.0) GO TO 230
X(I,I)=(PI/I.*SQT(I-AM1*AM1*FCOS*FCOS)*THR*THR/FCOS
230 CONTINUE
IF (K7.EQ.0) THR1=THR
KM=NW(I)
INC=1
ISA=1
L1=IPANEL+1
I7=1
MP=0
II=KM(I)
A=0
FACTOR=1.
AM=#AM1
PR=F1
CONT=ALPC
DO 320 NN=1,LAST
IF (NN.GE.LPANEL) NN=NN-LPANEL+IPANEL
IF (NN.LE.LPANFL) NN=NN+2*IPANFL
FN=II
IF (NN.GT.LPAK1.AND.NN.LE.LPAK2) ISA=2
IF (NN.GT.LPAK2.AND.NN.LE.LPAK3) ISA=3
IF (NN.GE.LPAK1.AND.NN.LE.LPAKFL) GO TO 240
GO TO 250
320 II=NN(II)
IF (NN.GE.LPAK2.AND.NN.LE.LPAKFL) II=NN(II)
GO TO 260
240 CONTINUE
IF (NN.GE.LPAK1.AND.NN.LE.LPAKFL) II=NN(II)
GO TO 260
250 CONTINUE
CHOPD=CH(I2)
IF (NN,EQ.0) GO TO 260
GO TO 270
270 CONTINUE
260  ISK=1SK+1
  LI=WJ, (IND).1]
270  N.L=WJ+IND).1]
  IF (NN,<EG».NL) IND=IND+1
  IF (NN*.GT,.LPANFL) FACTOR=O.E
  X1=XN(NN-1)-X; F(I)
  X2=YN(NN+2)-X, F(I)
  X12=YN(NN-1)-X; (NN)
  Y12=YN(NN+2)-X; (NN)
  Z12=ZN(NN+2)-X; (NN)
  Z12=ZN(NN-1)-X. (KP)
  Z?2XZN(NN+2)-2CP(KP)
  XJ=X12-Z12X12
  FCC=.1.
  NO 300 K=1,2
  IF (K7.FG,0.AND.K.FG,2) FCC=-1.
  IF (K.FG,1) GC TO 280
  N=1
  GO TO 290
280  N=2
290  CONTINUE
  YC=XYF(I)*(-1.,)WY
  Y1=YN(NN-1)*WY
  Y2=YN(NN-1)*YM
  X1=X12-Y1*X12
  Y12=Z12-Z12
  ALRFY=XYK*XYF*Y72+PP+Y72*Y72
  PXY2=SQRT(X12-X12*PP+Y1*Y1+PP+72*72)
  PXY2=(X12-X12*PP+Y1*Y1+PP+72*72)/PXY72
  UY=(X12-X12+PP+Y1*Y1+PP+72*72)
  1/PXY71
  CN1=(X12+X12/X12)/71
  CN2=(Y12+Y12)/72
  F1=UO*XK/ALRFY
  F2=GM1*Y1-GEN2*V
300  A+=F1*F2*SKA+J(TSA)*CHGFL*GAMKA(AK)/F4*F6*FACTOR)PCC
  IF (NN.L9.LA) GO TO 910
  I7=17+1
  W4=AW
  AW=AW+T
310  CONTINUE
320  CONTINUE
  A=ASFT
  THRT2=A/(CN*SC=CT(FTAN+FTAN+PP))
  THRT=T(THR+THR+PP)/CNV
  GAL(I)=Z*THR/(CTR+CNV)
  CN(I)=THR
  IF (K7,F0,.0) GC TO 330
  CT(I)=(F12*)*SC=CT(1.-AY*AV*FCMC*FCOS)THR*THR/FCOS

ORIGINAL PAGE IS OF POOR QUALITY
330 CONTINUE
RETURN
END

OVERLAY ((WNGJET, 5, 0))
&PCGRAPH LOAD

TO EVALUATE THE AERODYNAMIC CHARACTERISTICS
DIMENSION GAMP(330), GAMP(330), GAMP(330), GAWX(150), CPW(130), SLOD 40
IECT(30), CFP(10, 30), GAWX(150)
DIMENSION CQ(330)
DIMENSION SDWASP(100), AW(5), RW(40)
COMMON /GEOM/ HALFSW*CP(200), YCP(200), ZCP(200), XLE(50), YLE(50), XTL
1E(50), PSI(20), CF(55), XV(500), YV(100), SN(5, 8), XA(200, 2), YA(200, 2), ZL
2N(200, 2), WIDTH(2), YCON(25), SWEEP(50), HALF, SJ(21), EX(95, 2), TX(95)
3, 2, SC1(160, 5), SI1(160, 5), LC(3)
COMMON /AERO/ AP1, AN2, E1, P2, CL(30), CT(30), CD(30), GAM(2, 130)
COMMON /SOME/ NC, NWING, LAT, NAL, LKF, LWFJ, CHOPDT(3), SKG(5), YG(5), YCN
1(6), WKN, RDX, MDG, ANG
COMMON /CONST/ NC, NC, W1, M(6), NSJ, ACJ(5), LAST, NWI(3, 5), NWI(3, 5), JO
1PANEL, MJU(5), NW(3), NNJ, NW
COMMON /PARAM/ ALPC, ALPS, CCF, STDF, THTDF
COMMON /SCHEMT/ C(2), X(10, 41), Y(10, 41), SLOPE(15), XL(2, 15), XT(41), LOC
1XLL(41)
COMMON /ADD/ CP(130), CW(30), BREAK(8), SWP(R, 15), GAL(30), ISYM, VMU, WUL
1, TEF, FCR, CAMER, CAPLET, CAPTER, CATT, JX, YV, ZJ, PJ, ALP, CREF, TWISTR, L
1, TEF, FCR, CAMER, CAPLET, CAPTER, CATT, JX, YV, ZJ, PJ, ALP, CREF, TWISTR, L
1, TEF, FCR, CAMER, CAPLET, CAPTER, CATT, JX, YV, ZJ, PJ, ALP, CREF, TWISTR, L
1, TEF, FCR, CAMER, CAPLET, CAPTER, CATT, JX, YV, ZJ, PJ, ALP, CREF, TWISTR, L
1, TEF, FCR, CAMER, CAPLET, CAPTER, CATT, JX, YV, ZJ, PJ, ALP, CREF, TWISTR, L
1, TEF, FCR, CAMER, CAPLET, CAPTER, CATT, JX, YV, ZJ, PJ, ALP, CREF, TWISTR, L
1, TEF, FCR, CAMER, CAPLET, CAPTER, CATT, JX, YV, ZJ, PJ, ALP, CREF, TWISTR, L
1, TEF, FCR, CAMER, CAPLET, CAPTER, CATT, JX, YV, ZJ, PJ, ALP, CREF, TWISTR, L
1, TEF, FCR, CAMER, CAPLET, CAPTER, CATT, JX, YV, ZJ, PJ, ALP, CREF, TWISTR, L
1, TEF, FCR, CAMER, CAPLET, CAPTER, CATT, JX, YV, ZJ, PJ, ALP, CREF, TWISTR, L
1, TEF, FCR, CAMER, CAPLET, CAPTER, CATT, JX, YV, ZJ, PJ, ALP, CREF, TWISTR, L
1, TEF, FCR, CAMER, CAPLET, CAPTER, CATT, JX, YV, ZJ, PJ, ALP, CREF, TWISTR, L

PKS=PI*J*PI
A=PI*J*PI
R=PI*J*PI
NW2=NW(1)+NW(2)
NW3=NW(2)+NW(3)
NJ=NJ+1/2+1
IF (SYM.EQ.0) NJ=NJ+2
IF (SYM.EQ.0) JP=NSJ
AM=AM1
ALPH=ALP+180./PI
WRITE (6, 460)
WRITE (6, 450) ALPH
WRITE (6, 460)
2JET=ZCON(25)
1UDP=YCON(24)
IT=(TCON(73)
NC=IENTA
DF=SDF
CMU=C(1)
REWIND 01
PFAD (ITAPG) (GAMP(K), K=1, IPAPP)
READ (ITAPG) (GAMP(K), K=1, IPAPP)
READ (ITAPG) (GAMP(K), K=1, IPARM)
DO 160 KP=1, 12
K=KP-IA
IF (I.EQ.2) K=KP
SIDEJ=0.
1000 IF (KF.EQ.0.) GO TO 140
CALL UNWF (XV(K), YV(K), ZCP(K), AWSW, OWK2, 2)
1010 130 J=INTL
1020 KK=j+NTL
1030 SIDEF=SIDEF+SWW(J)*CJP(KK)
1040 IF (I.EQ.2) GO TO 150
1050 CALL SDWJ (SIDEJ, XV(K), YV(K), ZCP(K), GANP, PANEL, ISYM)
1060 CONTINUE
1070 IF (I.EQ.2) GO TO 160
CALL FORC (II, AM, CLT, CDT, SEC, CL, CM, CR, XLL, XLT, CPW, CPF, GAMP, LOC)
1080 140 IF (I.EQ.2) GO TO 150
1090 GAMP(KP)=GAMP(KP)-YV(K)/HALFb*GAWX(K)
1100 GAMP(KP)=GAMP(KP)-(SIDEF+SIDEF*PK)*GAWX(KP)
1110 CALL FORCE (II, AM, CLT, CDT, SEC, CL, CM, CR, XLL, XLT, CPW, CPF, GAMP, LOC)
1120 150 CALL FORC (II, AM, CLT, CDT, SEC, CL, CM, CR, XLL, XLT, CPW, CPF, GAMP, LOC)
1130 160 CALL FORC (II, AM, CLT, CDT, SEC, CL, CM, CR, XLL, XLT, CPW, CPF, GAMP, LOC)
1140 170 Do 200 K=1, NCS
1150 X(4,K)=CL(K)
1160 X(6,K)=CD(K)
1170 X(7,K)=CM(K)
1180 ITAPE=7
1190 ITAPG=0
1200 CONTINUE
1210 READ (OP) (CG(IS), IS=1, LWJ)
CDCL2=CDT/(CL*CLT)
IF (CLWW.LE.0.001) GO TO 220
CDWL2=CDWW/(CLWW*CLWW)
GO TO 230

220 CDWL2=0.
230 CONTINUE
WRITE (6,470)
KJ=0
JJJ=0
DO 310 I=1,NCS
JJJ=JJJ+1
IF (NW(2).EQ.0) GO TO 250
II=I+NCS
IF (NW(3).NE.0) GO TO 240
CHORD=CH(I)+CH(II)
GO TO 260

240 III=II+NCS
CHORD=CH(I)+CH(II)+CH(III)
GO TO 260

250 CHORD=CH(I)
260 CONTINUE
DO 310 I=1,NCS
JJJ=JJJ+1
IF (NW(2).EQ.0) GO TO 280
IF (J.LE.NW(1)) GO TO 280
LJ=LPANI*NW(2)(I-I)+NW(2)(I-I)
GO TO 290

270 LL=LPAN2*NW(3)(I-I)+NW(2)(I-I)
GO TO 290

280 LL=J
290 CONTINUE
XI=(XV(LL)-XLE(I))/CHORD
ETA=YV(LL)/HALFP
CPW=2.5*RAN(7,LL)*ALPC
CPT=CP(LL)*2.*
300 WRITE (6,480) KK,XI,ETA,CPT,CPW
JJJ=NCW-NW3*I
KI=K1+NCW
310 CONTINUE
WRITE (6,490)
DO 320 I=1,NCS
YE=YLE(I)/HALFP
320 WRITE (6,500) YE,CL(I),CM(I),CT(I),CD(I),X(4,I),X(7,I),X(6,I)
WRITE (6,510) CLT
WRITE (6,520) CTT
WRITE (6,530) CDCL2
WRITE (6,540) CMT
IF (II'SF.NF.J) GO TO 370

ORIGINAL PAGE IS OF POOR QUALITY
IF (DFJ.LE.0.001) GO TO 370
IF (ZJET.EQ.0.01) GO TO 370
SDFJ = SIN (DFJ)
CDFJ = COS (DFJ)
CLR = CMU * SIN (DFJ * ALP)
CDR = CMU * (VMU * COS (DFJ * ALP))
CF = COS (TDF)
SF = SIN (TDF)
IF (NNJ .EQ. 1) CDFJ = -CMU * COS (DFJ * ALP)
IJ = (NSJ + 1) / 2 - 1
IF (ISYV .EQ. 0) IJ = NSJ / 2 - 1
IF (NW(3) .NE. 0) GO TO 330
IF (NW(2) .EQ. 0) GO TO 340
IZ = CS * (MJWI (2, NJP) - LPANI - 1) / NW (? + 1)
KJ = MJWI (2, NJP)
NN = NW (2)
GO TO 350
GO TO 350
I7 = CS * 2 + (MJWI (3, NJP) - LPAN - 1) / NW (3) + 1
KJ = MJWI (3, NJP)
NN = NW (3)
GO TO 360
L0D2100
I7 = CS * 2 + (MJWI (3, NJP) - LPAN - 1) / NW (3) + 1
KJ = MJWI (3, NJP)
NN = NW (3)
DO 360 I = 1, IJ
YDIF = YN (KJ + 1) - YN (KJ)
CM1 = CM1 + YDIF * WIDTH (MJWI (NJP)) * (XLF (IZ) + CH (IZ) * CF) * SDFJ - CF (IZ) * SF * CLD2220
IF (NNJ .EQ. 1) WRITE (6, 650) CLF
IF (NNJ .EQ. 1) WRITE (6, 660) CLF
IF (NNJ .EQ. 1) WRITE (6, 570) CDR
IF (NNJ .EQ. 1) WRITE (6, 580) CDR
IF (NNJ .EQ. 1) WRITE (6, 590) CDR
IF (NNJ .EQ. 1) WRITE (6, 600) CDR
CONTINUE
CONTINUE
GO TO 350
WRITE (6, 610) CLW
WRITE (6, 620) CFW
WRITE (6, 630) CFW
CONTINUE
WRITE (6, 640) CLWW
WRITE (6, 650) CFW
WRITE (6, 660) CFW
IF (KF,FO,0) GO TO 400
WRITE (6,680) L00230
WRITE (6,690) L00240
REWIND 07 L00250
REWIND 08 L00260
S=XTEF-XLEF L00270
SS=SIN(ALP) L00280
CS=COS(ALP) L00290
X1=YN(6) L00300
CALL CPFUS (NCUMP,NT,CPF,NF,S,XLEF,XF,XAS,LPANEL,LPAN1,NKF,NW,B1) L00310
1,AM,SS,SNP,F0,F10,WAPD,0,LPANP,CRFF,NCJ,WJJ,LAST,0,NP) L00320
CALL FUSLFT (CPF,HALFSW,CPF,SS,CS,0,X1) L00330
WRITE (6,700) L00340
DO 390 I=1,NW L00350
CPW(I)=GAM(2,I)*ALPF L00360
SS=SIN(ALPF) L00370
CS=COS(ALPF) L00380
CALL CPFUS (NCUMP,NT,CPF,NF,S,XLEF,XF,XAS,LPANEL,LPAN1,NKF,NW) L00390
1,AM,SS,SNP,F0,F10,WAPD,0,LPANP,CRFF,NCJ,WJJ,LAST,0,NP) L00400
CALL FUSLFT (CPF,HALFSW,CPF,SS,CS,0,X1) L00410
400 IF (LAT,NE,1) GO TO 440 L00420
WRITE (6,710) L00430
WRITE (6,720) ALPF L00440
WRITE (6,730) AM L00450
JL=LAST L00460
REWIND 01 L00470
GO 430 I=1,2 L00480
G1=0. L00490
SS=0. L00500
CS=1. L00510
IF (KF,FO,0) GO TO 410 L00520
IF (1,EQ,1) REWIND 08 L00530
IF (1,EQ,2) REWIND 07 L00540
CALL CPFUS (NCUMP,NT,CPF,NF,S,XLEF,XF,XAS,LPANEL,LPAN1,NKF,NW) L00550
1,AM,SS,SNP,F0,F10,WAPD,0,LPANP,CRFF,NCJ,WJJ,LAST,3,NP) L00560
CALL FUSLFT (CPF,HALFSW,CPF,SS,CS,3,X1) L00570
CONTINUE CYR=SS+CYR L00580
WRITE (6,740) CYR L00590
CONTINUE CYR=SS+CYR L00600
WRITE (6,750) CYR L00610
ORIGINAL PAGE IS OF POOR QUALITY
540 FORMAT (1HO,35H TOTAL PITCHING MOMENT COEFFICIENT =,F10.5) LOD3410
550 FORMAT (1HO,34H THE COANDA LIFT COEFFICIENT, CLR =,F10.5) LOD3420
560 FORMAT (1HO,47H THE LIFT COEFFICIENT DUE TO JET REACTION, CLJ =,F10.5) LOD3430
1,5)
570 FORMAT (1HO,34H THE COANDA DRAG COEFFICIENT, CDR =,F10.5) LOD3440
580 FORMAT (1HO,47H THE DRAG COEFFICIENT DUE TO JET REACTION, CDJ =,F10.5) LOD3450
1,5)
590 FORMAT (1HO,36H THE COANDA MOMENT COEFFICIENT, CMR =,F10.5) LOD3460
600 FORMAT (1HO,58H THE PITCHING MOMENT COEFFICIENT DUE TO JET REACTION LOD3490
1, CVJ =,F10.5) LOD3500
610 FORMAT (1HO,59H THE LIFT COEFFICIENT WITH JET ENTRAINMENT ALONE =,F10.5) LOD3510
620 FORMAT (1HO,59H THE INDUCED DRAG COEFFICIENT WITH JET ENTRAINMENT =,F10.5) LOD3520
630 FORMAT (1HO,59H THE PITCHING MOMENT COEFFICIENT WITH JET ENTRAINMENT ALONE =,F10.5) LOD3530
640 FORMAT (1HO,59H THE LIFT COEFFICIENT FOR THE WING ALONE =,F10.5) LOD3540
650 FORMAT (1HO,59H THE INDUCED DRAG COEFFICIENT FOR THE WING ALONE =,F10.5) LOD3550
660 FORMAT (1HO,59H THE PITCHING MOMENT COEFFICIENT FOR THE WING ALONE =,F10.5) LOD3560
670 FORMAT (1HO,46H THE INDUCED MOMENT COEFFICIENT FOR THE WING ALONE =,F10.5) LOD3570
680 FORMAT (1HO,46H THE PITCHING MOMENT COEFFICIENT FOR THE WING ALONE =,F10.5) LOD3580
690 FORMAT (1HO,46H THE INDUCED MOMENT COEFFICIENT FOR THE WING ALONE =,F10.5) LOD3590
700 FORMAT (1HO,46H THE PITCHING MOMENT COEFFICIENT FOR THE WING ALONE =,F10.5) LOD3600
710 FORMAT (1HO,46H THE INDUCED MOMENT COEFFICIENT FOR THE WING ALONE =,F10.5) LOD3610
720 FORMAT (1HO,46H THE PITCHING MOMENT COEFFICIENT FOR THE WING ALONE =,F10.5) LOD3620
730 FORMAT (1HO,46H THE INDUCED MOMENT COEFFICIENT FOR THE WING ALONE =,F10.5) LOD3630
740 FORMAT (1HO,46H THE PITCHING MOMENT COEFFICIENT FOR THE WING ALONE =,F10.5) LOD3640
750 FORMAT (1HO,46H THE INCLINED SOLUTION COEFFICIENTS ARE GIVEN LOD3650
760 FORMAT (1HO,46H THE INCLINED SOLUTION COEFFICIENTS ARE GIVEN LOD3660
770 FORMAT (1HO,46H THE INCLINED SOLUTION COEFFICIENTS ARE GIVEN LOD3670
780 FORMAT (1HO,46H THE INCLINED SOLUTION COEFFICIENTS ARE GIVEN LOD3680
790 FORMAT (1HO,46H THE INCLINED SOLUTION COEFFICIENTS ARE GIVEN LOD3690
710) LOD3700
720) LOD3710
730) LOD3720
740) LOD3730
750) LOD3740
760) LOD3750
770) LOD3760
780) LOD3770
790) LOD3780
800) LOD3790
810) LOD3800
820) LOD3810
830) LOD3820
840) LOD3830
850) LOD3840
860) LOD3850
870) LOD3860
880) LOD3870
890) LOD3880
900) LOD3890
910) LOD3900
920) LOD3910
930) LOD3920
940) LOD3930
950) LOD3940
960) LOD3950
970) LOD3960
980) LOD3970
990) LOD3980
100) LOD3990
IA=I*(LAST-LPANEL)
IP=LAST-LPANEL
JCCT=XTE(50)
IP=1
IJ=1
IFF=1
JSN=1
JKT=1
NN=NW(1)
NN=NW(1)
INC=1
LI=LPANEL+1
LAST=LAST-1
FACTOP=1.
IF (J.EQ.2) FACTOP=-1.
FX=0.
VT=0.
GO 130 J=1+ICCA
FIN=J-IFF+1
IF (J.EQ.LPANEL) GC TO 40
IF (J.EQ.(LPANEL)+1) OR (J.EQ.(LPANEL+1)) IP=1
IF (JCCT.EQ.1 AND J>GT(LPANEL) GO TO 10
GO TO 20
10 IF (JKT.EQ.1 OR JKT.EQ.(NJH+1)) IP=1
20 CONTINUE
IF (J.EQ.LPANEL1 AND J.LF.LPANEL2) ISN=2
IF (J.EQ.LPANEL2 AND J.LF.LPANEL1) ISN=3
IF (J.EQ.LPANEL1 AND J.LT.LPANEL2) GC TO 30
GO TO 40
30 NN=NW(2)
40 CONTINUE
IF (J.EQ.LPANEL2 AND J.LT.LPANEL1) NN=NW(3)
IF (J.EQ.LPANEL2 AND J.LT.LPANEL1) NN=NJ(JK)
IF (J.EQ.LI) GC TO 70
IF (J.EQ.LI) GC TO 50
GO TO 60
50 ISN=ISN+1
LJ=NU(JK)+1
60 ML=NU(JK)+1
IF (NL.EQ.LAST) GC TO 70
IF (J.EQ.NL) I'D=INC+1
70 CONTINUE
J=J
IF (J.EQ.LPANEL1 AND J.EQ.LAST) JJ=J+IA
IF (J.EQ.LPANEL1 AND J.EQ.LAST) JJ=J+IR-LPANEL
C=ORD=CH(IK)
X=YN(J)+X
XP=YN(J)+X
VT=0.
XI2=ZN(J+2)-XN(J+1)
Y12=YN(J+2)-YN(J+1)
?1=ZN(J+1)-Z
Z2=ZN(J+2)-Z1*Z2
YZJ=X1*Z12-Z1*Z12
DO 120 II=1*2
FCP=1.
IF (II.GT.2) FCP=-1.*
YC=Y*FCP
Y1=YN(J+1)-YC
Y2=YN(J+2)-YC
XYK=X1*Y12=Y1*XY1
Z1=YN(J+1)-Z1
Z2=ZN(J+2)-Z1*Z2
ALP1=XYK*XJK+XJK*YJK+R1*Y1*Y1*Z
R1P1=SQR((XJ+X1*F1*Y1+Y1*Z1)*Z1)
RPE1=SQR((Z2+X2*Y2*Y2+R1*Z2*Z2))
UUB1=(X2*X12+Y1*Y12+Z1*Z12)/P?B1-(X1*X12+P1*Y1*Y12+Z1*Z12)
1)/R1P1
IF (II.EQ.1) GO TO 90
CONTINUE
G1P1=(1._X1/R1P1)/(Y1+Y1+Z1+Z1)
GO TO 100
90 IF (L.GT.2) GO TO 80
G1P1=0.
100 CONTINUE
G2P1=(1._X2/R2P1)/(Y2*Y2+Z2*Z2)
F12=UUB1*XJK/ALP1
G12=Z2*G2B1+Y1*G1B1
F13=UUB1*XJK/ALP1
G13=Z2*G2B1+Z1*G1B1
F1=-F13*CF*FCP-F12*SF
F2=G13*CF*FCP-F1*SF
F3=LUP1*Z1+ALP1
IF (J.LE.LPANEL) GO TO 110
F1=2.*F1
F2=2.*F2
F3=2.*F3
CONTINUE
U(R)=F3*CHORDS*N1(M1,ISN)*GAMMA(JJ)/(R.*FN)
120 W(R)=(F1+F2)*CHORDS*N1(M1,ISN)*GAMMA(JJ)/(R.*FN)
VT=(1.FACTOR*U2**VT
VX=U(R)*FACTOR*U1**VX
IF (J.LT.MM) GO TO 130
IP=IP+1
JT=JT+1
IF(=MM+1
MM=MM+1
IF (J.GT.LPANEL) JKT=JKT+1

ORIGINAL PAGE IS OF POOR QUALITY
IF (JKT.EQ.(NP+1)) JKT=1
CONTINUE
RETURN
END

SUBROUTINE FORCF (IC, AMCLT, CT, SECT, CL, CM, CD, XLL, XTT, CP, CPF, GFC)
10
1 AMP, GAMP, GAMR, CMLE, CMLT, CRM, CRR, CRF, CPR, CPL, CYP, CYP, CNP, CPR, CLR, LRR, GFC
20 CT
DIMENSION SECT(1), CL(1), CM(1), CD(1), XLL(1), XTT(1), CP(1), CPF, GFC
10
10 IC, AMCLT, CT, SECT, CL, CM, CD, XLL, XTT, CP, CPF, GFC
20 CT
COMMON /GEOH/, HFS, XCP(200), YCP(200), ZCP(200), XLE(50), YLE(50), XTF
30 IF (F0), PSI(20), CH(55), XV(200), YV(100), SN(3, A), XA(200, 2), YN(200, 2), ZFRC
40 N(200, 2), WIDTH(3), YCON(25), SWEEP(50), HALFB, SJ(1, 8), EX(95, 2), TX(95, 2)
50 3, 2, SC(160, 5), SI(160, 5), LC(3)
60 COMMON /COST/, LTCTAL, LPAN1, NJW(5), LPANEL, IEKTA, LPAN2, EXIT, PTIAL, TWFC
70 IF (0), PS!(20), CH(95), XV(200), YV(100), SN(3, A), XA(200, 2), YN(200, 2), ZFRC
80 N(200, 2), WIDTH(3), YCON(25), SWEEP(50), HALFB, SJ(1, 8), EX(95, 2), TX(95, 2)
90 3, 2, SC(160, 5), SI(160, 5), LC(3)
100 COMMON /COST/, LTCTAL, LPAN1, NJW(5), LPANEL, IEKTA, LPAN2, EXIT, PTIAL, TWFC
110 IF (0), PS!(20), CH(95), XV(200), YV(100), SN(3, A), XA(200, 2), YN(200, 2), ZFRC
120 N(200, 2), WIDTH(3), YCON(25), SWEEP(50), HALFB, SJ(1, 8), EX(95, 2), TX(95, 2)
130 3, 2, SC(160, 5), SI(160, 5), LC(3)
140 COMMON /COST/, LTCTAL, LPAN1, NJW(5), LPANEL, IEKTA, LPAN2, EXIT, PTIAL, TWFC
150 IF (0), PS!(20), CH(95), XV(200), YV(100), SN(3, A), XA(200, 2), YN(200, 2), ZFRC
160 N(200, 2), WIDTH(3), YCON(25), SWEEP(50), HALFB, SJ(1, 8), EX(95, 2), TX(95, 2)
170 3, 2, SC(160, 5), SI(160, 5), LC(3)
180 COMMON /COST/, LTCTAL, LPAN1, NJW(5), LPANEL, IEKTA, LPAN2, EXIT, PTIAL, TWFC
190 IF (0), PS!(20), CH(95), XV(200), YV(100), SN(3, A), XA(200, 2), YN(200, 2), ZFRC
200 N(200, 2), WIDTH(3), YCON(25), SWEEP(50), HALFB, SJ(1, 8), EX(95, 2), TX(95, 2)
210 3, 2, SC(160, 5), SI(160, 5), LC(3)
220 COMMON /COST/, LTCTAL, LPAN1, NJW(5), LPANEL, IEKTA, LPAN2, EXIT, PTIAL, TWFC
230 IF (0), PS!(20), CH(95), XV(200), YV(100), SN(3, A), XA(200, 2), YN(200, 2), ZFRC
240 N(200, 2), WIDTH(3), YCON(25), SWEEP(50), HALFB, SJ(1, 8), EX(95, 2), TX(95, 2)
250 3, 2, SC(160, 5), SI(160, 5), LC(3)
260 COMMON /COST/, LTCTAL, LPAN1, NJW(5), LPANEL, IEKTA, LPAN2, EXIT, PTIAL, TWFC
270 IF (0), PS!(20), CH(95), XV(200), YV(100), SN(3, A), XA(200, 2), YN(200, 2), ZFRC
280 N(200, 2), WIDTH(3), YCON(25), SWEEP(50), HALFB, SJ(1, 8), EX(95, 2), TX(95, 2)
290 3, 2, SC(160, 5), SI(160, 5), LC(3)
300 COMMON /COST/, LTCTAL, LPAN1, NJW(5), LPANEL, IEKTA, LPAN2, EXIT, PTIAL, TWFC
310 IF (0), PS!(20), CH(95), XV(200), YV(100), SN(3, A), XA(200, 2), YN(200, 2), ZFRC
320 N(200, 2), WIDTH(3), YCON(25), SWEEP(50), HALFB, SJ(1, 8), EX(95, 2), TX(95, 2)
330 3, 2, SC(160, 5), SI(160, 5), LC(3)
340 COMMON /COST/, LTCTAL, LPAN1, NJW(5), LPANEL, IEKTA, LPAN2, EXIT, PTIAL, TWFC
350 IF (0), PS!(20), CH(95), XV(200), YV(100), SN(3, A), XA(200, 2), YN(200, 2), ZFRC
360 N(200, 2), WIDTH(3), YCON(25), SWEEP(50), HALFB, SJ(1, 8), EX(95, 2), TX(95, 2)
370 3, 2, SC(160, 5), SI(160, 5), LC(3)
380 COMMON /COST/, LTCTAL, LPAN1, NJW(5), LPANEL, IEKTA, LPAN2, EXIT, PTIAL, TWFC
390 IF (0), PS!(20), CH(95), XV(200), YV(100), SN(3, A), XA(200, 2), YN(200, 2), ZFRC
400 N(200, 2), WIDTH(3), YCON(25), SWEEP(50), HALFB, SJ(1, 8), EX(95, 2), TX(95, 2)
410 3, 2, SC(160, 5), SI(160, 5), LC(3)
420 COMMON /COST/, LTCTAL, LPAN1, NJW(5), LPANEL, IEKTA, LPAN2, EXIT, PTIAL, TWFC
430 IF (0), PS!(20), CH(95), XV(200), YV(100), SN(3, A), XA(200, 2), YN(200, 2), ZFRC
440 N(200, 2), WIDTH(3), YCON(25), SWEEP(50), HALFB, SJ(1, 8), EX(95, 2), TX(95, 2)
450
DO 100 I=1,NCS
   IF (NW(2).EQ.0) GO TO 20
   I=I*NCS
   IF (NW(3).NE.0) GC TO 10
   CHORD=CH(I)+CH(II)
   GO TO 30
10   III=II+NCS
   CHORD=CH(I)+CH(II)+CH(III)
   GO TO 30
20   CONTINUE
30   CONTINUE
   CPL=0.
   CD(I)=0.
   CYPS=0.
   CLPS=0.
   CNPS=0.
   CYPF=0.
   CLPF=0.
   CNPF=0.
   IF (YLE(I).GT.YG(KW)) GO TO 40
   GO TO 50
40   KW=KW+1
   SK=FNG(KW)
   CK1=SPT(1.-SK/2)
   CONTINUE
50   DO 140 J=1,NCW
   NN=J*NW
   IF (NW(2).EQ.0) GO TO 70
   IF (J.LE.NW(1)) GO TO 70
   IF (J.GT.NW(2)) GO TO 60
   LL=LPANI+NW(2)*(I-1)+J-NW(1)
   IL=I
   JLL=J-NW(1)
   L=2
   FN=NW(2)
   GO TO 80
60   LL=LPAN2+NW(3)*(I-1)+J-NW(2)
   IL=III
   JLL=J-NW(3)
   L=3
   FN=NW(3)
   GO TO 80
70   LL=NN
   IL=I
JLL=J
L=I
FN=KW(I)
80 CONTINUE
XC=(XV(LL)-XLE(I))/CHORD
AZ=7CR(XC)
BZ=7CT(XC)
GRS=CP(LL)*SA(JLL,L)*CH(IL)/FN
IF (DF(NL)*LE.0.001) GO TO 90
IF (PIFA*L.E.0.1) GO TO 100
IF (NW(3)*EQ.0) GO TO 120
IF (LL*G.E.*NW1(3,NL)*AND.LL*LF.*NW2(3,NL)) GC TO 110
90 CAM=A7-(AZ-BZ)*YV(LL)/HALFP
EPHA=XLL(I)-ATAN(CAM)
EP=EP-ATAN(CAM)
CS=COS(EP)
SS=SIN(EP)
SC1=SIN(EPIA-XLL(I))
CC1=COS(EPIA-XLL(I))
GO TO 130
100 IF (NW(2).NE.0.AND.LL.LE.LPAN1) GC TO 90
IF (NW(3).NE.0.AND.LL.LE.LPAN2) GC TO 90
110 EP=XLL(I)*DF(NL)
CAM=A7-(AZ-BZ)*YV(LL)/HALFP
EP=EP-ATAN(CAM)
CS=COS(EP)
SS=SIN(EP)
SC1=SIN(EPIA-XLL(I))
CC1=COS(EPIA-XLL(I))
GO TO 130
120 IF (LL*G.E.*NW1(3,NL).AND.LL.LE.NW2(3,NL)) GC TO 110
GO TO 90
130 CONTINUE
CL(I)=CL(I)+CB*SC
CM(C)=CM(C)-CP*XV(LL)*CS
CD(I)=CD(I)+CS*SS
IF (LAT.NE.1.OF.ID.EQ.1) GO TO 140
JJJ=LL+IA
WP=GAMP(JJ)*SA(JLL,L)*CH(IL)/FN
WB=GAMJ(JJ)*SA(JLL,L)*CH(IL)/FN
WR=GAMJ(JJ)*SA(JLL,L)*CH(IL)/FN
CLPS=CLBS*WP*CK1*CC1
CLPS=CLPS*WP*CK1*CC1
CNPS=CNPS*WP*SC1*YLF(I)+RP*XV(LL)*SK*CC1
CNPS=CNPS*WP*SC1*YLF(I)+RP*XV(LL)*SK*CC1
CNPS=CNPS*WP*SC1*YLF(I)+RP*XV(LL)*SK*CC1
CNPS=CNPS*WP*SC1*YLF(I)+RP*XV(LL)*SK*CC1
CNPS=CNPS*WP*SC1*YLF(I)+RP*XV(LL)*SK*CC1
CNPS=CNPS*WP*SC1*YLF(I)+RP*XV(LL)*SK*CC1
140 CONTINUE
CALE=CMLEP-(CAMLER-CAMLET)*YLF(I)/HALFP
EPHA=xLL(I)-ATAN(CAMEL)
CZ=COS(EPHA)
D7=SIGN(EPHA)
CL(I)=CL(I)*PI/CHORD*SECT(I)*D7
CM(I)=CM(I)*PI/(CREF*CHORD)
CD(I)=CD(I)*PI/CHORD*SECT(I)*C7
IF (LAT.NE.1.OR.ID.EQ.1) GO TO 150
FS=COS(SWEEP(I))
CTH=PI/2.*SORT(I.-AW**AM*FS*FS)/FS
CLPS=CLPS*PI/CHORD
CLPS=CLPS*PI/CHORD
CNPS=CNPS*PI/CHORD
CNPS=CNPS*PI/CHORD
CYPS=CYPS*PI/CHORD
SSN=SIN(SWEEP(I))
TAN=SSN/FS
CTPS=CTH*TAN
SIDE=CTH**2.*CPF(I,1)*CPF(3,1)
SIDE2=0.
SIDE3=0.
CNPS-CAPS=PI/CHORD=CTH**2.*CPF(I,1)*CPF(3,1)*YLF(I)
CNPS=CNPS-SIDE**2*XLE(I)
CYP=CLPS**2*CK1*XLE(I)
CYP=CYP-SIDE**2*XLE(I)
CNP=CNPS-SIDE**2*XLE(I)**2*SIN(KL)
CNP=CNP-SIDE**2*XLE(I)**2*SIN(KL)
CLPS=CLPS**2*PI/CHORD
CONTINUE
IF (I.LT.NCOL) GO TO 160
KLL=NCOL-1
K=K+1
NCOL=NCOL+1
160
KL=I-KLL
FM=M1(KC)
AA=CHORD*SJ(KL,*K)*WIDTH(KC)/FM
CLT=CLT+CL(I)*AA
CMT=CMT+CM(I)*AA
CDT=CDT+CD(I)*AA
IF (LAT.NE.1.OR.ID.EQ.1) GO TO 170
CYP=CYP+CYRS**2*YLF(I)
CNP=CNP+CNBS**2*AA
CLP=CLP+CLPS**2*AA*YLE(I)
CYP=CYP+CYRS**2*AA

ORIGINAL PAGE IS OF POOR QUALITY
CNP = CNP + CNPS * AA
CYP = CYP + CYRS * AA
CLRF = CLRR + CLRS * AA * YLE (I)
CNR = CNR + CNRS * AA

170 CONTINUE
MM = (NCW - NW3) * I
IF ((LL, EG, MJ42 (IU, NL)) NL = NL + ]

180 CONTINUE
IF (LAT, NE, 1, OR, ID, FG, 1) GO TO 220
SUM1 = 0.
SUM2 = 0.
SUM3 = 0.
SUM4 = 0.
SUM5 = 0.
SUM6 = 0.
KD = KG
ISH = 1
FN = NW(1)
K1 = 1
NO 210 J = 1, NCW
JJ = J
IF (J, LE, NW(1)) GO TO 200
IF (J, GT, (NW(1) + NW(2))) GO TO 190
ISH = 2
FN = NW(2)
JJ = J - NW(1)
K1 = 2
GO TO 200
ISH = 3
FN = NW(3)
JJ = J - NW(1) - NW(2)
K1 = 3

200 FJJ = JJ
X0 = YCN (K1) + 0.5 * CHORDT (K1) * (1 - COS((2 * FJJ - 1) * PI / (2 * FH))
CK = CHORDT (K1) * P * CPF (2, J) * CPF (4, J) * SN (JJ, ISH) / FN
CKZ = CHORDT (K1) * 2 * CPF (2, J) * CPF (6, J) * SN (JJ, ISH) / FN
CK = CHORDT (K1) * 2 * CPF (2, J) * CPF (4, J) * CPF (P, J) * SN (JJ, ISH) / FN
COT = SORT (1 - 5 * C (K1) * SN (KD))
CK = CK * COT
CKZ = CKZ * COT
SUN1 = SUM1 + CK
SUN2 = SUM2 + CKZ
SUN3 = SUM3 + CK2
SUN4 = SUM4 + CK2 * XQ
SUN5 = SUM5 + CK3
SUN6 = SUM6 + CK3 * XQ
SUM2 = SUM2 + CK * XQ
SUM1 = SUM1 * PI + 2.
SUM2 = SUM2 * PI + 2.
CYP = CYP + SUM
CNP = CNP - SUM
CYP = CYP + SUM3 * PI * 2
CNP = CNP - SUM4 * PI * 2
CYP = CYP + SUM5 * PI * 2
CNP = CNP - SUM6 * PI * 2

220 CONTINUE

CLT = CLT * PI / (2. * HALFSW)
CMT = CMT * PI / (2. * HALFSW)
CDT = CDT * PI / (2. * HALFSW)

IF (LAT .NE. 1 .OR. IT .EQ. 1) GO TO 230

CYP = CYB * PI / (2. * HALFSW) / BK

FRC 2400 CONTINUE

CLP = CLP * PI / (4. * HALFSW * HALFP)
CLP = CLP * PI / (4. * HALFSW / HALFP)

CYP = CYB * PI / (2. * HALFSW)
CNP = CNP / PI / (2. * HALFSW)

230 CONTINUE

CPNTEN FUSLFT (CPF, HALFSW, CFFS, SS, CS, L, X1)

FRC 2450 COMMON /FUS/ XF (20), XCF (20), RF (20), SNP (5, 20), XLEF, XTEF, WA'C (20), XCFLE /FUS/ XF (20), XCF (20), RF (20), SNP (5, 20), XLEF, XTEF, WAC (20), XCFLE

10 DO 10 I = 1, NF
XCF = XF (I)

110 IF (LKE .EQ. 0) GO TO 20

10 CONTINUE

CNP = 0.
CAF = 0.
CFI = 0.

DO 50 I = 1, NCW
IF (NH1 .NE. 0 .AND. I .LE. NH1) GO TO 30

50 CONTINUE

FCLW = NCW - NH1

60 IF (J .EQ. NH1) GO TO 40

TP = TH1

20 CONTINUE

FCLW = NH1

30 FCLW = NH1

ORIGINAL PAGE IS OF POOR QUALITY
PP=TH1
TP=0.
CONTINUE
TETA=(2.*FI1.)*PP/(2.*FCUW)+TP
IF (L.GE.?1) CST(I)=SIN(TETA)
IF (L.LT.?1) CST(I)=COS(TETA)
FNK=NKF(1)
SL=XAS(2)-XAS(1)
MM=NKF(1)
NC=1
NN=0
DO 90 I=1,NF
CPTL=0.
IP=I-NN
DO 80 K=I,NCUM
IF (NHI.NE.0.AND.K.LE.NHI) GO TO 60
FCUW=NCUM-NHI
PP=PI-TP1
GO TO 70
FCUW=NHI
PP=T41
CONTINUE
90 CONTINUE
CPTL=CPTL+CPF(K,I)*CST(K)*PP/FCUW
CTL(I)=-2.*CPTL
GR=RP(I)*SNP(NC,IF)*CTL(I)*SL/(2.*FNK)
CA(I)=GE*FNK/SL
X=XF(I)
S=SLFTI
DRX=SLOP(X)/PP
CAF=CAF+GE*DRX
CMF=CMF+GR*XF(I)
IF (I.LT.NM.CP.I.EQ0.NF) GO TO 90
NC=NC+1
NN=10M
MM=WN.NKF(NC)
SL=XAS(NC+1)-XAS(KC)
FNK=NKF(NC)
90 CONTINUE
IJK=0
IF (ARS((XAS(2)*XTEF)/SLFTI).GT.0.01) GO TO 130
IJK=1
FNF=NF
NF1=NF+1
DO 110 J=1,NF1
AW(J)=0.
FK=J
DO 100 K=1,NF
FJK=110
CONTINUE
C* EMPIRICAL METHOD TO FIND THE STATION AT WHICH THE FLOW CEASES TO REF.

C POTENTIAL. SEE DATACOM +

IF (J.EQ.I)

AW(J)=AW(J)/FNF

IF (J.NE.1) AW(J)=AW(J)*2./FNF

CONTINUE

C

C

ORIGINAL PAGE IS OF POOR QUALITY
SUPROUTINE CPFUS (TNPCPFF, SXLEF, XASLPAN, CPF10, CPF20, CPF30, CPF40, CPF50, CPF60, CPF70, CPF80, CPF90, CPF100, CPF110, CPF120, CPF130, CPF140, CPF150, CPF160, CPF170, CPF180, CPF190, CPF200, CPF210, CPF220, CPF230, CPF240, CPF250, CPF260, CPF270, CPF280, CPF290, CPF300, CPF310, CPF320, CPF330, CPF340, CPF350, CPF360, CPF370, CPF380, CPF390, CPF400, CPF410, CPF420, CPF430, CPF440, CPF450)

DIMENSION R(1), XF(1), RF(20), SNP(5, 20), WARD(1), NKF(1), NW(1), IAS(1)

DIMENSION CPF(10, 1), U(P), V(B), NCJ(1), WJJ(1)

PI=3.14159265

MACRO

IF (L*AE, 0) AZ=0

FL=0.

FL1=0.

FNK=NKF (1)

SL=XAS(2)-XAS(1)

NC=NC(1)

NN=NN

LTOTAL=JL*2-LPANEL

IF (JL LE 0) LTOTAL=LPANEL1,

DO 10 I=1, NF

II=I+LTOTAL

TCP=I-NN

XC=XF(I)

RF(I)=FUR(XC)

FL1=FL1+RI(I)*SNP(NC, IP)*SL/FNK

FL=FL+WARD(I)*SNP(NC, IP)*SL/FNK

IF (IL, LP, OR, I, E0. NF) GO TO 10

NC=NC+1

NN=NN

M=NN*NKF(NC)

SL=XAS(NC+1)-XAS(NC)

FNK=NKF(NC)

CONTINUE

FL=FL+0.5*PI*FL

FL1=FL1+0.5*PI*FL1

DO 150 I=1, NF

AI=XF(I)-XTLEF

A2=SQRT(AI*AIP*PF(I)*PF(1))

XP=XF(I)-XTLEF

A6=SQRT(XP*XPFBF(RF(I))

RFTL=(A1-A2)/RF(I)

RFT0=(XP+A6)/RF(I)

END
J=0
IF (L=KF.0) J=1
CONTINUE CPF 460
20 II=I+NF*(J-1)+LTCTAL CPF 470
FNK=NKF(I) CPF 480
SL=XAS(I)-XAS(1) CPF 490
WM=NKF(I) CPF 500
HC=1 CPF 510
NN=0 CPF 520
FJ=J CPF 530
U(J+1)=0. CPF 540
V(J+1)=0. CPF 550
IF (J.GT.2) GO TO 70 CPF 560
RFL=-(A+A2)/QF(J) CPF 570
RF0=-(XP+A6)/PF(J) CPF 580
IF (J.LT.2) GO TO 10 CPF 590
PFTL=0. CPF 600
PFT0=0. CPF 610
CONTINUE CPF 620
DO 60 KC=1,NF CPF 630
81=XF(I)-XF(KC) CPF 640
RF=SQRT(RF(I)*RF(I)+PF(I)) CPF 650
KK=K+KF*(J-1)+LTCTAL CPF 660
IF (J.EQ.0) GC TO 40 CPF 670
U(J+1)=U(J+1)-P(KK)*RF*XAF(IP)*SL/FNK CPF 680
IF (J.EQ.0) GO TO 50 CPF 690
V(J+1)=V(J+1)+P(KK)*SNP(IP)*PFTX-RFTL)*SL/FNK CPF 700
GO TO 50 CPF 710
60 U(J+1)=U(J+1)-WARD(KC)-WARD(I)*RF*XAF(IP)*SL/FNK CPF 720
IF (J.EQ.0) GO TO 60 CPF 730
NC=NC+1 CPF 740
NN=NN+1 CPF 750
MM=MM+KNF(NC) CPF 760
SL=XAS(NC+1)-XAS(I) CPF 770
FNK=NKF(NC) CPF 780
CONTINUE CPF 790
60 IF (J.EQ.0) V(J+1)=(-V(J+1)*0.5*PI+(RFTL-RFT0)*F10)/(4.*PI) CPF 800
IF (J.EQ.0) V(J+1)=(-V(J+1)*0.5*PI)/(4.*PI) CPF 810
IF (J.EQ.0) U(J+1)=-(FL*PFL-FPOPFO+U(J+1)*0.5*PI-WAPC(I))*ALCG((A1+CPF 820
1A2)/(XP+A6)))/4.*PI CPF 830
IF (J.EQ.0) L(J+1)=-(FL*PFL-FPOPFO+U(J+1)*0.5*PI+WAPC(I))*ALCG((A1+CPF 840
1A2)/(XP+A6)))/(4.*PI) CPF 850
IF (J.EQ.0) L(J+1)=-(FL*PFL-FPOPFO+U(J+1)*0.5*PI+B(I))/FJ*(RFL*ACPF 860
1A2)/(XP+A6)))/(4.*PI) CPF 870
CONTINUE CPF 880
70 CONTINUE CPF 890
70 V(J+1)=V(J+1)/PF(I) CPF 900
CONTINUE CPF 910
J=J+1
IF (J,LE,N) GO TC 20
N1=2
IF (L,NE,0) N1=N+1
DO 140 K=1,NT
IF (NH1,NE,0.AND.K.LE.NH1) GO TO 80
FK=K-NH1
FT=NT-NH1
PP=PT-TH1
TP=TH1
GO TO 90
FK=K
FT=NH1
PP=TH1
TP=0
CONTINUE
90 THETA=(2.*FK-1.)*PP/(2.*FT)+TP
SINTA=SIN(THETA)
COSTA=COS(THETA)
PHIX=0.
PHIT=0.
DO 100 J=N-1,1
FJ=J
IF (L,LE,1) PHIX=PHIX+U(J)*COS((FJ-1.)*THETA)
IF (L,GT,1) PHIX=PHIX+U(J)*SIN((FJ-1.)*THETA)
IF (L,LE,1) PHIT=PHIT+V(J)*SIN((FJ-1.)*THETA)
IF (L,GT,1) PHIT=PHIT-V(J)*COS((FJ-1.)*THETA)
100 X=XPHI(T)
Y=RF(I)*SINTA
Z=RF(I)*COSTA
CALL UTFW (X,Y,Z,SINTA,COSTA,LAST,LPAN1,BB,LPANL,NL,BX,VX,VL,LPN12,NCJNJJ,LX,KJF,HP)
PHIX=PHIX+VX
PHIT=PHIT+VT
IF (L,NE,0) GC TO 110
DRX=DRX/RF(I)
SRX=SRX/DRX
DRX=CS*U(I)*DRX*SRX
UVFL=CS*PHIX
VDF1=1.-UVFL*OP-DRX*$2
PHIT=PHIT-OP*SINTA
IF (JL,LE,LAST) WRITE (07) PHIX,PHIT
IF (JL,LE,0) WRITE (07) PHIX,PHIT
GO TO 120
110 IF (JL,LE,LAST) READ (08) PX,PT
IF (JL,LE,0) READ (07) PX,PT
C VDF1=2.*(1.+PX)*PHIX+?..AV=MNPX&PHI
VDF1=2.*PHIX
CONTINU

IF (AM.LT.0.1) GC TO 130
IF (LH.NE.0) GC TO 130
CPF(K,I)=VDIFAM*AP*PHI*PHI
GO TO 140
CPF(K,I)=VDIF
CONTINUE
CPF1500
CONTINUE
CPF1510
CPF1520
CPF1530
CPF1540
END
SUBROUTINE SDWJ (WK,X,Y,Z,GAMMA,LPANEL,ISYM)
DIMENSION GAMMA(1)
COMMON /GEOM/ HALFSW,XCP(200),YCP(200),ZCP(200),XLE(50),YLE(50),XTSDW 30
1E(50),PSI(20),CP(95),XY(200),YY(100),SN(8,P),XN(200,2),YN(200,2),ZSDW 40
2N(200,2),WIDTH, YCON(25),SWFFP(50),HALFR,SJ(21,8),EX(95,2),TX(55)
DIMENSION GAMMA(1)
COMMON /CONST/ NCW,NCJ,1P(8),NJ,NCJ(5),LAST,WNk(3,5),WJ(3,5)
1PANEL,1PJ(5),Nw(3),Nf,JP
COMMON /AERO/ AM1,AM2,AP1,AP2,CL(30),CT(30),CD(30),GAM(2,130)
ISN=1
IF(NW(2).NE.0) IZ=IZ+NCW
IF(NW(3).NE.0) IZ=IZ+NCW
IZ=IZ+1
IF(NW(2).NE.0) ISN=ISN+1
IF(NW(3).NE.0) ISN=ISN+1
WK=0
IFF=LPANEL
IND=1
MM=LPANEL+NCJ(1)
NN=NCJ(1)
LAST=LAST-1
LP=LPANEL+1
JL=LPANEL+1
DO 70 1=1,J=LAST
JJ=J-1
LP=LPANEL+J1
MT=J-1
FN=MA
IF (JJ.LE.MJJ(IND)) MM=NCJ(IND)
CMCPD=CP(17)
IF (JJ.EQ.L1) GC TO 10
GO TO 20
10 I=I+1
L1=MJJ(IND)+1
20 NL=MJJ(IND)
IF (NL.LE.LAST1) GO TO 30
IF (L.J.EQ.L1) IND=IND+1
CONTINUE
30
\[
\begin{align*}
X_1 &= X_N(J+1) - X \\
X_2 &= X_N(J+2) - X \\
X_12 &= X_N(J+2) - X_N(J+1) \\
Y_12 &= Y_N(J+2) - Y_N(J+1) \\
Z_12 &= Z_N(J+2) - Z_N(J+1) \\
Z_1 &= Z_N(J+1) - Z \\
Z_2 &= Z_N(J+2) - Z \\
X_{7J} &= X_1Z_{12} - Z_1X_{12} \\
C_0 &= E_0 \text{ II} = 1 + 2 \\
FCP &= 1. \\
\text{IF } (II \leq 60) \text{ FCP} = 0. \\
\text{IF } (II \leq 60) \text{ FCP} = 0. \\
Y_C &= Y \cdot FCP \\
Y_1 &= Y_N(J+1) - Y_C \\
Y_2 &= Y_N(J+2) - Y_C \\
Y_{7J} &= Y_1Z_{12} - Y_1X_{12} \\
Z_7 &= Y_1Z_{12} - Z_1Y_{12} \\
\text{ALP} &= \text{xy}^{*}x_{7J} + \text{xy}^{*}x_{7J} + \text{xy}^{*}y_{7J} + \text{xy}^{*}y_{7J} \\
\text{R1P} &= \text{SOFT} \left( x_{14}x_{14} + x_{14}y_{14} + x_{14}y_{14} + x_{14}y_{14} \right) \\
\text{R2P} &= \text{SQRT} \left( x_{20}x_{20} + y_{20}y_{20} + x_{20}y_{20} + y_{20}y_{20} \right) \\
\text{RR} &= \text{SOFT} \left( x_{10}x_{10} + x_{10}y_{10} + x_{10}y_{10} + x_{10}y_{10} \right) \\
\text{IF } (\text{ALP} \leq 0) \text{ \text{TO } 40} \\
\text{IF } (\text{F1} \leq 0) \text{ \text{TO } 50} \\
\text{F1} &= -(x_{10}x_{10} - x_{10}y_{10}) \cdot 2 \cdot FCP \\
\text{GO TO 50} \\
\end{align*}
\]
This document describes in detail the necessary information for using a computer program to calculate the aerodynamic characteristics under symmetrical flight conditions and the lateral-directional stability derivatives of wing-body combinations with upper-surface-blowing (USB) or over-wing-blowing (OWB) jets. This program is an updated version of that described in NASA TM X-73987. In addition to the features and restrictions described in NASA TM X-73987, the following new features have been added to the program: (1) a fuselage of arbitrary body of revolution has been included. The effect of wing-body interference can now be investigated, and (2) all nine lateral-directional stability derivatives can be calculated.

The program is written in Fortran language and runs on CDC Cyber 175 and Honeywell 66/60 computers. It is available from COSMIC of the University of Georgia, Athens, Georgia.