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User's Guide to Program FLEXSTAB

A Final Report
to the
National Aeronautics and Space Administration
Manned Spacecraft Center

research performed under
Contract No. NAS 9-11303

by

R. K. Cavin, Co-Principal
Investigator and Associate Professor
of Electrical Engineering

and

D. Colunga, Co-Principal Investigator and
Associate Professor, Computing Science

February 23, 1975

Texas A&M University
Texas Engineering Experiment Station
Space Technology Division
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Industrial Engineering/Computing Science
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6. Normal Modes Program 12
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8. Geometry Definition Plot Program 28
Summary

This document represents a user's manual for correctly submitting FLEXSTAB program runs on the UNIVAC 1108 computer system. All major program modules, converted and correctly executed by Texas A&M project personnel, have been included. All CUR control cards have been documented for the user's convenience. The JOB card parameters have also been included in order to provide some idea as to "reasonable" time estimates for the program modules.
FIG. 1  FLEXTAB FUNCTIONAL FLOW
Geometry Definition (GD) Program

**Input Required**
GD Data Deck

**Program Required**
GD program in Tape PCF = Tape B

**Program Correction Required**
None

**Output File Generated**
Tape A = GD tape = A05090

**File Destinies**
Tape A: SAIC
UAIC
ISIC
ESIC
SDSS
TH
GDPLDT

**Cover Sheet Format**
Ref-GD/1

**Control Cards**
Ref-GD/2
### INSTRUCTIONS FOR CENTRAL COMPUTER COMPLEX COMPUTER RUNS

**Ref-GD/1**

**PROGRAMMER**
D. Colunga

<table>
<thead>
<tr>
<th>BADGE NO.</th>
<th>BOX NO.</th>
<th>PHONE NO.</th>
<th>DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1048</td>
<td>C-16</td>
<td>5971</td>
<td></td>
</tr>
</tbody>
</table>

**DIVISION CODE**
FD 32

**PROGRAM NO.**
E169

**PROJECT NO.**
3696E

**EST TIME**
1

**MAX. TIME**
2

**LINES OUTPUT**
6k

**DECK NO.**
C-16

**OPERATING SYSTEM**

<table>
<thead>
<tr>
<th>OPERATING SYSTEM</th>
<th>TYPE OF RUN</th>
<th>LOG NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>II08 FORTRAN V</td>
<td>TEST</td>
<td></td>
</tr>
<tr>
<td>II08 FORTRAN IV</td>
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<td></td>
</tr>
<tr>
<td>II08 OTHER</td>
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</tbody>
</table>

**COMPUTER REQUIREMENTS**

<table>
<thead>
<tr>
<th>II08 FORTRAN V</th>
<th>II08 FORTRAN IV</th>
<th>II08 OTHER</th>
</tr>
</thead>
<tbody>
<tr>
<td>3200 SCOPE</td>
<td>3200 SMARTS</td>
<td>3200 OTHER</td>
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</tbody>
</table>

**INPUT TAPES**

<table>
<thead>
<tr>
<th>RACK</th>
<th>UNIT</th>
<th>REEL NO.</th>
<th>FILE NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>*</td>
<td>B</td>
<td>PCF</td>
<td>A</td>
</tr>
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</table>

**OUTPUT TAPES**

<table>
<thead>
<tr>
<th>UNIT</th>
<th>REEL NO.</th>
<th>FILE NAME</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>A05090</td>
<td>A</td>
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**YES**

**INPUT TAPES**

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<th>REEL NO.</th>
<th>FILE NAME</th>
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<tbody>
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</table>

**OUTPUT TAPES**

<table>
<thead>
<tr>
<th>UNIT</th>
<th>REEL NO.</th>
<th>FILE NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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**WORKING TAPES**

<table>
<thead>
<tr>
<th>REEL NO.</th>
<th>NO. FRAMES</th>
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</thead>
<tbody>
<tr>
<td>4060</td>
<td></td>
</tr>
</tbody>
</table>

**ABNORMAL STOPS**

<table>
<thead>
<tr>
<th>STOP AT LOC.</th>
<th>TOTAL TAPE DRIVES USED</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR</td>
<td></td>
</tr>
<tr>
<td>LOOPING LOC.</td>
<td></td>
</tr>
<tr>
<td>THRU</td>
<td></td>
</tr>
<tr>
<td>EXCESS OUTPUT</td>
<td></td>
</tr>
<tr>
<td>EXCESS TIME</td>
<td></td>
</tr>
</tbody>
</table>

**PROGRAMMER'S COMMENTS**

* Tape B is a special Texas A&M PCF tape.

---

**OPERATOR'S COMMENTS**

**SYSTEM OPERATOR**
VP RUN 01048,FD32,C16,3696E,E169,C,2,6
VN MSG FILE REQ TAPE 2 EH 432 1 FSTRN 1
ASG A=A
ASG B=PCF
ASG E
XQT CUR
TRW B
IN B
REL B
XQT GD
GD DATA DECK
FIN
Steady Aerodynamic Influence Coefficient (SAIC) Program

Input Required
(1) Tape A = GD tape = A05090 (File generated by GD run)
(2) SAIC data deck

Program Required
SAIC in PCF tape (=Tape E)

Program Corrections Required
None

Output Files Generated
(1) Tape B = SAIC TAPE B = A01827

File Destinies
(1) Tape B: UAIC
       CAIC
       SDSS

Cover Sheet Format
Ref-SAIC/1

Control Cards
Ref-SAIC/2

SAIC Data Deck
Ref-Boeing Document
INSTRUCTIONS FOR CENTRAL COMPUTER COMPLEX COMPUTER RUNS

Ref-SAIC/1

<table>
<thead>
<tr>
<th>PROGRAMMER</th>
<th>BADGE NO.</th>
<th>BOX NO.</th>
<th>PHONE NO.</th>
<th>DATE</th>
<th>PRIORITY</th>
<th>INITIALS</th>
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</thead>
<tbody>
<tr>
<td>D. Colunga</td>
<td>1048</td>
<td>C-16</td>
<td>5971</td>
<td>6/2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

DIVISION CODE | PROG. NO. | PROJ. NO. | EST. TIME | MAX. TIME | LINES OUTPUT | DECK NO. |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>FD-32</td>
<td>E169</td>
<td>3696E</td>
<td>50</td>
<td>240</td>
<td>2k</td>
<td></td>
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</tbody>
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OPERATING SYSTEM | TYPE OF RUN | LOG NO. | COMPUTER |
<table>
<thead>
<tr>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>1106 FORTRAN V</td>
<td>TEST</td>
<td>3000</td>
<td>SMARTS</td>
</tr>
<tr>
<td>1106 FORTRAN IV</td>
<td>OTHER (EXPLAIN BELOW)</td>
<td>3000</td>
<td>OTHER</td>
</tr>
<tr>
<td>1106 OTHER</td>
<td>OTHER</td>
<td>3000</td>
<td>OTHER</td>
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</table>

INPUT TAPES

<table>
<thead>
<tr>
<th>RACK</th>
<th>UNIT</th>
<th>REEL NO.</th>
<th>FILE NAME</th>
<th>UNIT</th>
<th>REEL NO.</th>
<th>FILE NAME</th>
<th>C</th>
<th>SAVE</th>
<th>PROCESSING REQUIRED</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>A05090</td>
<td>A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>E</td>
<td>PCF</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>A01827</td>
<td>SAIC</td>
<td></td>
<td></td>
<td></td>
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</table>

OUTPUT TAPES

<table>
<thead>
<tr>
<th>RACK</th>
<th>UNIT</th>
<th>REEL NO.</th>
<th>FILE NAME</th>
<th>C</th>
<th>SAVE</th>
<th>PROCESSING REQUIRED</th>
</tr>
</thead>
</table>

WORKING TAPES

<table>
<thead>
<tr>
<th>4060</th>
<th>REEL NO.</th>
<th>NO. FRAMES</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>16 MM</td>
<td>35 MM</td>
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ABNORMAL STOPS

<table>
<thead>
<tr>
<th>STOP AT LOC.</th>
<th>TOTAL TAPE DRIVES USED</th>
<th>ACTUAL TIME USAGE</th>
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<tr>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DUMP INSTRUCTIONS</td>
<td></td>
</tr>
<tr>
<td></td>
<td>NO DUMP</td>
<td></td>
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<tr>
<td></td>
<td>DUMP ON STOP</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DUMP ON LOOP</td>
<td></td>
</tr>
<tr>
<td></td>
<td>OTHER</td>
<td></td>
</tr>
</tbody>
</table>

PROGRAMMER'S COMMENTS

PCF = Special Texas A&M Input Tape.

OPERATOR'S COMMENTS

SYSTEM OPERATOR
Ref-SAIC/2 Control Cards

VZ RUN 01048,FD32,C16,3696E,E169,C,240,2
VW ASG A=A05090
VZ ASG E=PCF
VW ASG B=SAIC
VX XOT CUR
    TRW E
    IN E
    ERS
    IN E
    REL E
VX MAP PROG
    SEG AIC-MPAK-*(CPTGEN,AICGEN,TRNOVR,CAMTHK-*(CAMBER,THICK))
    MPAK SEG RHEAD-WHEAD-RVEC-WVEC-VLIN-VIP-LOCATE
VX XOT PROG
        SAIC DATA DECK (cf REF-Boeing Document)

VFIN
Internal Structural Influence Coefficient (ISIC) Program

Input Required
(1) Tape A - GD Tape = A05090 (File Generated by GD Run)
(2) ISIC Data Deck

Program Required
ISIC in A06973 tape (= Tape Z)

Output Files Generated
(1) Tape B = A07178
(2) Tape C = A03098
(3) Tape D = A13214
(4) Tape E = A04911
(5) Tape F = A01734
(6) Tape G = A.7233

Matrix Catalog
Symmetric Normal Modes Matrices
Anti-symmetric Normal Modes Matrices
Symmetric SDSS Matrices
Anti-symmetric SDSS Matrices
Elastic Axis Plot Tape

File Destinies
(1) Tape B: NM, SDSS
(2) Tape C: NM
(3) Tape D: NM
(4) Tape E: SDSS, MERGE
(5) Tape F: SDSS, MERGE
(6) Tape G: SLOAD, EAPLOT

Cover Sheet Format
Ref-ISIC/1

Control Cards
Ref-ISIC/2

ISIC Data Deck
Ref-Boeing Document
### INSTRUCTIONS FOR CENTRAL COMPUTER COMPLEX: COMPUTER RUNS

**Ref-ISIC/1**

**Programmer:** D. Colunga

**Badge No.:** 1619  **Box No.:** C-16  **Phone No.:** 5971  **Date:** 6/23

<table>
<thead>
<tr>
<th></th>
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<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>EX 24</td>
<td>E169</td>
<td>3696E</td>
<td>120</td>
<td>180</td>
<td>12k</td>
<td></td>
</tr>
</tbody>
</table>

**Operating System**

- 1108 FORTRAN V
- 3200 SCOPE

**Type of Run**

- PROD.
- TEST

**Computer Requirements**

- OTHER (EXPLAIN BELOW)

**Input Tapes**

<table>
<thead>
<tr>
<th>Rack</th>
<th>Unit</th>
<th>Reel No.</th>
<th>File Name</th>
<th>Unit</th>
<th>Reel No.</th>
<th>File Name</th>
<th>C</th>
<th>Save</th>
<th>Processing Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>A05090</td>
<td>A</td>
<td>A07178</td>
<td>B</td>
<td>B</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Z</td>
<td>A06973</td>
<td>Z</td>
<td>A03098</td>
<td>C</td>
<td>C</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>D</td>
<td>D</td>
<td>Yes</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>E</td>
<td>E</td>
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<td></td>
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<td>F</td>
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<td></td>
<td></td>
<td>G</td>
<td>A07233</td>
<td>Yes</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

**Working Tapes**

- 4060

**Abnormal Stops**

- STOP AT LOC. SR.
- LOOPING LOC. THRU
- EXCESS OUTPUT
- EXCESS TIME

**Programmer's Comments**

**Operator's Comments**

**S/STFM**

**Operator**
Ref-ISIC/2

VZ RUN 01619,EX24,C16,3696E,E169,C,180,12
IN MSG FILE REQ TAPE 8 FH432 2 FSTRN 16
= ASG A=A05090
S ASG B=B
S ASG C=C
VS ASG D=D
VS ASG E=E
VS ASG F=F
VS ASG G=G
V ASG Z=A06973
V XQT CUR
TRW Z
IN Z
REL Z
V MAP PROG
SEG ISIC-MPAK-*(GDPROG,OPTION,THRE,FMAT)
MPAK SEG VIP-VLIN-RVEC-WVEC-RHEAD-WHEAD-LOCATE
THRE SEG SIC-* (SDEF,SAFMA,TMAT,MMAT)
V XQT PROG

ISIC DATA DECK 'cf REF-Boeing Document')

FIN
Normal Modes (NM) Program

Input Required
(1) Tape A = ISIC catalog tape = A06909 (File generated by ISIC)
(2) Tape C = Symm ISIC tape = A06668 (File generated by ISIC)
(3) Tape D = Asym ISIC tape = A06292 (File generated by ISIC)
(4) NM Data Deck

Program Required
NM program in T0204 tape = Tape Z

Program Correction Required
(1) Insert New SUBROUTINE AG_IE to read as follows:
   SUBROUTINE AG_IE
   DIMENSION MT(12)
   REWIND 1
   REWIND 2
   100 READ (1) I,J,K,MT
   WRITE (2) I,J,K,MT
   IF(I.GT.-1) GO TO 100
   REWIND 1
   REWIND 2
   STOP
   END
   REASON: Tape A should contain the original ISIC catalog, while tape B contains the altered catalog at the end of Normal Modes execution.
   NOTE: (1) This program should precede all Normal Modes runs. (2) Tape B from ISIC should be mounted on unit A (not unit B)

(2) Statement number 74 of MONITR: New Insert to read as follows:
   IF(ICF.EQ.0) GO TO 100
   REASON: Check value of ICF to get out of DO LOOP.

(3) Statement number 26 of CTINIT:
   Delete 4 statements and newly insert to read as follows:
   Delete COMMON/CTO1/LCAT
   COMMON/CTO2/NFOUT
   COMMON/CTO3/LFOUT(6)
   COMMON/CTO4/NMOUT(6)
   Insert COMMON/CTO1,LCAT,NFOUT,LFOUT(6),NMOUT(6)
   REASON: Make common statement compatible with the other subroutines

(4) Statement number 46 and 47 of DSN: New Insert to read as follows:
   REWIND 7
   REWIND 8
REASON: Rewind Tape E and Tape F

Output File Generated

1. Tape B = NM catalog tape = A08012
2. Tape E = Symm NM tape = A01078
3. Tape F = Asym NM tape = A01344
4. Tape G = Shape NM tape = A08045

Matrix catalog from ISIC to SDSS
Symmetric Matrices to SDSS program
Anti-symmetric Matrices to SDSS program
Model shape tape to NMPLOT program

File Destinies

1. Tape B: SDSS
2. Tape E: MERGE
3. Tape F: MERGE
4. Tape G: NMPLOT

Cover Sheet Format

Ref-NM/1

Control Cards

Ref-NM/2
INSTRUCTIONS FOR CENTRAL COMPUTER COMPLEX COMPUTER RUNS

Ref-NM/1
Programmer
D. Colunga

<table>
<thead>
<tr>
<th>Badge No.</th>
<th>Div. Code</th>
<th>Proj. No.</th>
<th>ROF Programmed</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1619</td>
<td>EX 24</td>
<td>E169</td>
<td>3696E</td>
<td>6/30</td>
</tr>
</tbody>
</table>

**Operating System**

<table>
<thead>
<tr>
<th>System</th>
<th>Type of Run</th>
<th>Log No.</th>
<th>Computer Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>FORTRAN IV</td>
<td>TEST</td>
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</table>

**Input Tapes**

<table>
<thead>
<tr>
<th>Rack</th>
<th>Unit</th>
<th>Reel No.</th>
<th>Disk Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>A</td>
<td>A06909</td>
<td>A</td>
</tr>
<tr>
<td>C</td>
<td>C</td>
<td>A06668</td>
<td>E</td>
</tr>
<tr>
<td>D</td>
<td>D</td>
<td>A06292</td>
<td>F</td>
</tr>
<tr>
<td>Z</td>
<td>Z</td>
<td>T0204</td>
<td>G</td>
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</table>

**Output Tapes**

<table>
<thead>
<tr>
<th>Rack</th>
<th>Unit</th>
<th>Reel No.</th>
<th>Disk Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
<td>A08012</td>
<td>B</td>
</tr>
<tr>
<td>C</td>
<td>E</td>
<td>A01078</td>
<td>E</td>
</tr>
<tr>
<td>D</td>
<td>F</td>
<td>A01344</td>
<td>F</td>
</tr>
<tr>
<td>Z</td>
<td>G</td>
<td>A08045</td>
<td>G</td>
</tr>
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</table>

**Working Tapes**

| Reel No. | 4060 |

**Abnormal Stops**

STOP AT LOC. 8 SR.

**Looping Loc.**

<table>
<thead>
<tr>
<th>Dump Instructions</th>
</tr>
</thead>
<tbody>
<tr>
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**Excess Output**

<table>
<thead>
<tr>
<th>Dump on Stop</th>
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</table>

**Excess Time**

<table>
<thead>
<tr>
<th>Dump on Loop</th>
</tr>
</thead>
</table>

**Programmer's Comments**

*Tape Z = T0204 is a special Texas A&M Tape*
Ref-NM/2-1/2

\[\text{VP RUN 01619, EX24, C16, 3696E, E169, C, 50, 5} \quad \text{D. COLUNGA}\]

\[\text{vN MSG FILE REQ TAPE 8 FH432 2 FSTRN 8}\]

\[\text{v ASG A=A06909}\]

\[\text{v ASG B=A08012}\]

\[\text{v ASG C=A06668}\]

\[\text{v ASG D=A06292}\]

\[\text{v ASG E=A01078}\]

\[\text{v ASG F=A01344}\]

\[\text{v ASG G=A08045}\]

\[\text{v ASG H, I, J, K, L, M, N, P}\]

\[\text{v FOR AGGIE}\]

\[\text{AGGIE SOURCE DECK}\]

\[\text{v XQT AGGIE}\]

\[\text{v XQT CUR}\]

\[\text{TRW A}\]

\[\text{REL A}\]

\[\text{v ASG Z=T0204}\]

\[\text{v XQT CUR}\]

\[\text{TRW Z}\]

\[\text{IN Z}\]

\[\text{TRW Z}\]

\[\text{REL Z}\]

\[\text{v FOR,* MONITR,MONITP}\]
-73
   IF(ICF.EQ.0) GO TO 100
   \FOR,* CTINIT,CTINIT
-26,29
   COMMON/CT01/LCAT,NFOUT,LFOUT(6),NMOUT(6)
   \FOR,* DSN,DSN
-45
   REWIND 7
   REWIND 8
   MAP NMP
      SEG NM-MPAK-*(INCONT,SHAPE,FNMAT,NMOUT)
MPAK SEG VIP-VLIN-RVEC-WVEC-RHEAD-WHEAD-LOCATE
   XQT NMP

   NM DATA DECK

   FIN
Stability Derivatives and Static Stability (SDSS) Program

I. Generate Absolute SDSS Program

Program Required
Symbolic and relocatable SDSS in PCFC tape (= Tape C)

Output Files Generated
Tape G = A08126 Absolute SDSS tape

File Destinies
Tape G: SDSS

Cover Sheet Format
Ref-SDSS-1/1

Control Cards
Ref-SDSS-1/2
## INSTRUCTIONS FOR CENTRAL COMPUTER COMPLEX COMPUTER RUNS

**Ref-SDSS-I/1**

**PROGRAMMER**
D. Colunga

**DIVISION CODE**
FD 32

**BADGE NO.**
1048

**BOX NO.**
16-C

**PHONE NO.**
5971

**DATE**
6/16

**PROG. NO.**
E169

**PROJ. NO.**
3696E

**EST. TIME**
5

**MAX. TIME**
6

**LINES OUTPUT**
2

**DECK NO.**
1

### OPERATING SYSTEM

<table>
<thead>
<tr>
<th>OPERATING SYSTEM</th>
<th>TYPE OF RUN</th>
<th>LOG NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>II 06 FORTRAN V</td>
<td>☐ 3200 SCOPE ☐</td>
<td>☐ PROM. ☐ TEST ☐</td>
</tr>
<tr>
<td>II 06 FORTRAN IV</td>
<td>☑ 3200 SMARTS ☐</td>
<td>☑ OTHER (EXPLAIN BELOW) ☐</td>
</tr>
<tr>
<td>II 06 OTHER</td>
<td>☐ 3200 OTHER ☐</td>
<td>☐ OTHER</td>
</tr>
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</table>

### COMPUTER REQUIREMENTS

- 1106 FORTRAN IV
- 5200 SMARTS
- OTHER (EXPLAIN BELOW)

### INPUT TAPES

<table>
<thead>
<tr>
<th>RACK</th>
<th>UNIT</th>
<th>REEL NO.</th>
<th>FILE NAME</th>
<th>UNIT</th>
<th>REEL NO.</th>
<th>FILE NAME</th>
<th>C</th>
<th>SAVE</th>
<th>PROCESSING REQUIRED</th>
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<tbody>
<tr>
<td>C</td>
<td>PCFC</td>
<td>C</td>
<td>G</td>
<td>A08126</td>
<td>G</td>
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### WORKING TAPES

<table>
<thead>
<tr>
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<th>REEL NO.</th>
<th>NO. FRAMES</th>
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<tbody>
<tr>
<td>4060</td>
<td>☐</td>
<td>4060</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>16 MM</td>
<td>35 MM</td>
</tr>
</tbody>
</table>

### ABNORMAL ST. PS

- STOP AT LOC.
- LOOPING LOC.
- EXCESS OUTPUT
- EXCESS TIME

### TOTAL TAPE DRIVES USED

2

### ACTUAL TIME USAGE

- DUMP INSTRUCTIONS
- STOP
- NO DUMP
- X
- DUMP ON STOP
- DUMP ON LOOP
- OTHER

* PCFC is a special Texas A&M PCF Tape

---

**PROGRAMMER'S COMMENTS**

**OPERATOR'S COMMENTS**
Ref-SDSS-1/2-1/4

VP RUN 01048,FD32,C16,3696E,E169,C,6,1
VN MSG FILE REQ TAPE 2 FH432 O FSTRN 1
VW ASG C=PCFC
V ASG E
V ASG G=A08126
V COM 03477775
V XQT CUR
   TRW C
   IN C
   ERS
   IN C
   TRW C
   TRW E
      TW E, CARDIN/CODE
      TW E, DCONRL/CODE
      TW E, DEXDW/CODE
      TW E, DPERT/CODE
      TW E, DSTAB/CODE
      TW E, DWT/CODE
      TW E, DGYRO/ CODE
      TW E, FA/ CODE
      TW E, FT/ CODE
      TW E, FTOTAL/ CODE
      TW E, F2F3/ CODE
      TW E, MATPRT/ CODE
Ref-SDSS-I/2-2/4

TWR E,SPECS/CODE
TWR E,TA/CODE
TWR E,TMDATA/CODE
TWR E,TMPRT/CODE
TWR E,TRIM/CODE
TWR E,TRIMCC/CODE
TWR E,TRIMIT/CODE
TWR E,TM/CODE
TWR E,WTDATA/CODE
TWR E,WTDER/CODE
TWR E,CSAB/CODE
TWR E,CINVER/CODE
TWR E,VIPA/CODE
TWR E,DATE/CODE
TWR E,INTURP/CODE
TWR E,DIA/CODE

TEF E
ERS
TRW E
IN E
TRW E

MAP CARDAL,CARDAL
SEG CARDIN-DPRT-DWT-DSTAB-DCONRL-DGYRO-DTRST-MATPRT-;
SPECS-INTURP-DATA-DATE-DEXDW
DEF CARDIN
v MAP TRIA,TRIA
  SEG TRIM-TRIMIT-FTOTAL-TMPRT-CINVER-CSAB-WTDER-F2F3-
  WTDATA-TRIMCC-FT-FA-VIPA-FS-TA-TS-TMDATA
  DEF TRIM
v XQT CUR
  TOC
  TRW C
  TRW E
  OUT E
  TEF E
  TRW E
  ERS
  IN C
  ERS
  IN C
  TRI C
  IN E
  TRI E
v MAP SDSSPE,SDSSPE
  SEG SDSS-MPAK-* (ONE,ENGINE,TRANS,DUAL,BASIC,SIX,POST)
MPAK SEG RHEAD-WHEAD-RVEC-WVEC-VLIN-VIP
ONE SEG PREPARE-* (CARDIN,TAPEIN)
SIX SEG STACON-* (DONE,TRIM,SHAPE,INTWD,SDSP,PERT1,P2,PERT3,PERT4)
P2 SEG PERT2-* (RDULSC-VAICA-UAICS-UDATA-UCTRAN,UPRES)
v ABS SDSSPE,SDSSDE
Stability Derivatives and Static Stability (SDSS) Program

II SDSS Run

Input Required
(1) Tape A = GD tape = A05090 (File generated by GD)
(2) Tape B = SAIC tape = A01827 (File generated by SAIC)
(3) Tape C = Catalog tape = A08118 (File generated by ISIC)
(4) Tape D = Symm ISIC tape = A14061 (File generated by ISIC)
(5) Tape E = Asym ISIC tape = A12922 (File generated by ISIC)
(6) SDSS Data Deck

Program Required
Tape Z = ABS SDSS tape = A08126 (File generated by SDSS-I)

Program Correction Required
None

Output File Generated
(1) Tape F = SDSS tape
(2) Punched card output

File Destinies
Tape F: SLOADS
CER
TH

Cover Sheet Format
Ref SDSS-II/1

Control Cards
Ref SDSS-II/2
## INSTRUCTIONS FOR CENTRAL COMPUTER COMPLEX COMPUTER RUNS

**Ref: SDSS-11/1**

<table>
<thead>
<tr>
<th>PROGRAMMER</th>
<th>BADGE NO.</th>
<th>BOX NO.</th>
<th>PHONE NO.</th>
<th>DATE</th>
<th>PRIORITY &amp; INITIALS</th>
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<tr>
<td>N. Colunga</td>
<td>1619</td>
<td>E-16</td>
<td>5071</td>
<td>6/23</td>
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<table>
<thead>
<tr>
<th>DIVISION CODE</th>
<th>PROG NO</th>
<th>PROJ NO</th>
<th>EST TIME</th>
<th>MAX TIME</th>
<th>LINES OUTPUT DECK NO</th>
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<tbody>
<tr>
<td>EX 24</td>
<td>E169</td>
<td>3696E</td>
<td>10</td>
<td>15</td>
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</table>

### OPERATING SYSTEM

- FORTRAN V
- FORTRAN IV
- OTHER

### TYPE OF RUN

- PROD
- TEST
- OTHER

### COMPUTER REQUIREMENTS

- 3200
- SMARTS
- OTHER

### INPUT TAPES

<table>
<thead>
<tr>
<th>RACK</th>
<th>UNIT</th>
<th>REEL NO</th>
<th>NAME</th>
<th>UNIT</th>
<th>REEL NO</th>
<th>FILE NAME</th>
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<th>SAVE</th>
<th>PROCESSING REQUIRED</th>
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<tr>
<td>A</td>
<td>A</td>
<td>A05090</td>
<td>F</td>
<td>F</td>
<td>Yes</td>
<td>4060</td>
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<td>B</td>
<td>B</td>
<td>A01827</td>
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<tr>
<td>C</td>
<td>C</td>
<td>A08118</td>
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<td></td>
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<tr>
<td>D</td>
<td>D</td>
<td>A140061</td>
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<tr>
<td>E</td>
<td>E</td>
<td>A12922</td>
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<td></td>
</tr>
</tbody>
</table>

### WORKING TAPES

- 4060

### OUTPUT TAPES

- 16 MM
- 35 MM

### ABNORMAL STOPS

- STOP AT LOC.
- LOOPING LOC.
- EXCESS OUTPUT
- EXCESS TIME

### TOTAL TAPE DRIVES USED

- 7

### ACTUAL TIME USAGE

- STOP
- START

### PROGRAMMER'S COMMENTS

### OPERATOR'S COMMENTS
VP RUN 01048,FD32,C16,3696E,F169,C,15,5
VN MSG FILE REQ TAPE 7 FH432 2 FSTRN 16
VN MSG PUNCHED CARD OUTPUT
\* ASG A=A05090
\* ASG B=A01827
\* ASG C=A08118
\* ASG D=A14061
\* ASG E=A12922
\* ASG F=F
\* ASG Z=A08126
\* XQT CUR
   TRW Z
   IN Z
   REL Z
\* XQT SPSSDE

SDSS DATA DECK

\*FIN
Program To Fix Up SDSS

V RUN
VN MSG TAPE 2 FH432 0 FSTRN 2
V ASG A= Current SDSS PCF Tape
V ASG B=B
V ASG C,D
V COM 03477775
V XQT CUR
  TRW A
  FIND A,SPECS/SYMBOLIC
  TRD A
V FOR, *SPECS, SPECS
-211
  REWIND NT17
V XOT CUR
  TRW C
  OUT C,1 SYMBOLIC
  TEF C
  TRW D
  OUT D,3 RELOCATABLE
  TEF D
  ERS
  TRW A
  TRW C
  I: A
  IN C
  TRW B
  OUT B UPDATED SYMBOLIC FILE
  TEF B
  ERS
  IN A
  TRW D
  IN D
  OUT B + RELOCATABLE FILE UPDATED
  TEF B
TRW A
TRW B
REL A
ERS
IN B
LIST SPECS
TRW B
REL B
FIN
Geometry Definition Plot Program (GDPlot)

Input Required
(1) GD Tape = ZZ0424 (Generated by GO)
(2) GDPlot Data Deck

Program Required
GDPlot program (source) Deck consist of
(1) GDPL
(2) PGD
(3) LOCATE and
(4) Subprogram of the CALCOMP and GERBER basic software namely
   PLOT, LINE, AXIS, NUMBER, SCALE, SYMBOL, STOPP, etc.
(5) Subprogram in S/360 Library such as DATE

Program Change Required
Subroutine STOPP (equivalent to LINE4 of CALCOMP package) should be
added to the last plot program.

Output Generated
(1) GERBER Tape (Used as the input data for GERBER
    plotter: 7track)
(2) GERBER plotted sheet
(3) "Geometric Data from Geometry Definition File" (printed sheet)

Job Control Cards
Ref-GDPL-1

OS/360 Job Ticket
Ref-GDPL-2

GERBER Job Ticket
Ref-GDPL-3

Work Statistics
(1) IBM S/360 Card in 910
    Card out 0
Lines 1932 line
Time 1.12 min.
Cost $8.52

(2) GERBER 622 Time about 40 min.
Ref-GDPL-1

//DQ835 JOB (909T4,3-C--,002,003,DC)," D. COLUNGA SPACE SHUTTLE "
/*CLASS F 230k - 320k TAPE SETUP
/*SETUP
// EXEC GERBER,PARM.FORT=BCD,REGION=320k
//FORT.SYSIN DD *

GDPLOT SOURCE DECK

//GO.FT01F001 DD UNIT=TAPE9,
// VOL=SER=ZZ0424,
// DISP=(OLD,PASS),
// LABEL=(1,NL),
// DCB=(RECFM=VSB,LRECL=7196,BLKSIZ=7200)
//GO.SYSIN DD *

GDPL DATA DECK

/*
**OS/360 JOB TICKET**

<table>
<thead>
<tr>
<th>User Name</th>
<th>Return To</th>
<th>Run Time</th>
<th>Lines</th>
<th>Cards</th>
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<tbody>
<tr>
<td>D. Colunga</td>
<td>3-C</td>
<td>002</td>
<td>003</td>
<td>0</td>
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</table>

<table>
<thead>
<tr>
<th>Class</th>
<th>Requested Priority</th>
<th>Assigned</th>
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</thead>
<tbody>
<tr>
<td>F</td>
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</tbody>
</table>

### VOLUME

<table>
<thead>
<tr>
<th>Step Name</th>
<th>Data Set Name</th>
<th>Volume</th>
<th>Action Code</th>
<th>File Protect Ring</th>
<th>Library Control</th>
<th>Slot No.</th>
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</thead>
<tbody>
<tr>
<td>GO</td>
<td>APTAPE</td>
<td>zz0455</td>
<td>Tape 7</td>
<td>Out</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>zz0424</td>
<td>Tape 9</td>
<td>Out</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Operator Comments**

Program terminated normally: □ Yes □ No

Time turned in ____________________

If No, specify system ABEND Code __________ I/O Error on __________

Step GO □ Yes □ No JCL Error □ Yes □ No

Time Executed ____________________

specify reason
On the plotter area below, roughly sketch your expected results. Clearly show the starting point for the plot, and note the total width and height of your drawing.
Program Correction For GDPL

1. Problem
GDPL was originally programmed for plotting data using the CALCOMP. This program could be used for the GERBER plotter except that in the GERBER the last line was not produced.

2. Program Change Suggestion
On the GERBER CALL STOPP gives the required final line.
Therefore in GDPL

**ORIGINAL PROGRAM**

CARD #

0061 60 READ (NTGD) (STOR(I),I=1,10),XO,YO,ZO,THETR,STOR(11)
(Comment: READ NEW DATA from GD tape)

0062 IF(STOR(1).EQ.0) GO TO 400
(Comment: Check if DATA is completed)

0352 400 PGNU=PGNU+15.

0353 CALL PLOT (PGNI,-YPAGE,-3) (To reset origin for next file)

0354 CALL PGD (NTGD,KFILGD) (To print GDTAPE)

**Correction**
Insert CALL STOPP between 0353 and 0354

3. Document
There are no documents containing GERBER instructions. However, subroutine "STOPP" is equivalent to subroutine "LINE4" of CALCOMP basic package.

**Subroutine** LINE4 (from LOCAL OS/360 Library Subroutines pp 30.0)

LINE4 - is used to purge the buffer to insure that the last plot of a job is complete. An end file mark is placed on the plot tape. LINE4 should be the last plotting routine called and should only be called once.

CALL LINE4 No arguments are used.