4. AUTOCAD APPLICATIONS IN SHIP DESIGN – 2D LINES PLAN DRAWINGS

A script is a text file with one command on each line.

You can invoke a script at startup, or you can run a script from within AutoCAD using the SCRIPT command. A script provides an easy way to create continuously running displays for product demonstrations and trade shows.

You create script files outside AutoCAD using a text editor (such as Microsoft® Windows Notepad) or a word processor (such as Microsoft® Word) that can save the file in ASCII format. The file extension must be .scr.

Each line of the script file contains a command. Each blank space in a script file is significant: AutoCAD accepts either a space or ENTER as a command or data field terminator. You must be very familiar with the sequence of AutoCAD prompts to provide an appropriate sequence of responses in the script file.

Note keep in mind that AutoCAD prompts and command names may change in future releases, so you may need to revise your scripts when you upgrade to a later version of AutoCAD. For similar reasons, avoid the use of abbreviations; future command additions might create ambiguities.

A script can execute any command at the Command prompt except a command that displays a dialog box. AutoCAD provides command line versions of the dialog box commands.

Script files can contain comments. Any line that begins with a semicolon (;) is considered a comment, and AutoCAD ignores it while processing the script file. The last line of the file must be blank.

All references to long file names that contain embedded spaces must be enclosed in double quotes. For example, to open the drawing my house.dwg from a script, you must use the following syntax:

open "my house"

The following commands are useful in scripts:

DELAY	Provides a timed pause within a script (in milliseconds)
GRAPHSCR	Switches from the text window to the drawing area
RESUME	Continues an interrupted script
RSCRIPT	Repeats a script file
TEXTSCR	Switches to the text window

Example 4.1. Set limits to -10,-10 10,10 and draw a line 0,0 0,5

```
ROTATE L
 0,0 -6
DELAY 1000
RSCRIPT
```

Example 4.2. To create a script that draws a line

```
LIMITS -10,-10 10,10
ZOOM A
GRID 10
LTSCALE 3.0
LAYER SET 0 COLOR RED

LINE
0,0
0,5
```

4.1. Script File for Body Plan Drawing

A body plan consists of a series of 2D curves representing the ship sections or stations. The coordinates (offsets) of these sections must be provided as an offset table.

Example 4.3. Let us assume that typical offsets for a section are given as follows

Y	Z	
0.000	-2.076	station 17
0.380	-2.061	
0.702	-2.018	
0.971	-1.950	
1.191	-1.863	
1.367	-1.759	
1.503	-1.644	
1.605	-1.520	
1.674	-1.391	
1.710	-1.260	
1.715	-1.130	
1.690	-1.004	
1.635	-0.884	
1.554	-0.773	
1.342	-0.572	
1.115	-0.384	
1.017	-0.289	
0.937	-0.193	
0.876	-0.093	
0.796	0.108	
0.756	0.308	
0.735	0.600	
0.755	0.918	
0.794	1.168	
0.942	1.779	
1.352	3.108	
1.972	5.129	
2.061	5.403	
2.317	6.160	

Then the script file (Section.scr) is

```
;station 17
PLINE
0.000,-2.076
0.380,-2.061
0.702,-2.018
0.971,-1.950
1.191,-1.863
1.367,-1.759
1.503,-1.644
1.605,-1.520
1.674,-1.391
1.710,-1.260
1.715,-1.130
1.690,-1.004
1.635,-0.884
1.554,-0.773
1.342,-0.572
1.115,-0.384
1.017,-0.289
0.937,-0.193
0.876,-0.093
0.796,0.108
0.756,0.308
0.735,0.600
0.755,0.918
0.794,1.168
0.942,1.779
1.352,3.108
1.972,5.129
2.061,5.403
2.317,6.160
```

This script file can be modified to specify the limits of the drawing. The curve fit and line thickness can also be added as follows (Section1.scr)

```
;station 17
LIMITS -3,-3 10,10 GRID 10
ZOOM A
PLINE
0.000,-2.076
0.380,-2.061
0.702,-2.018
0.971,-1.950
1.191,-1.863
1.367,-1.759
1.503,-1.644
1.605,-1.520
1.674,-1.391
1.710,-1.260
1.715,-1.130
1.690,-1.004
1.635,-0.884
1.554,-0.773
1.342,-0.572
1.115,-0.384
1.017,-0.289
0.937,-0.193
0.876,-0.093
0.796,0.108
0.756,0.308
0.735,0.600
0.755,0.918
0.794,1.168
0.942,1.779
1.352,3.108
1.972,5.129
2.061,5.403
2.317,6.160
 PEDIT
L W 0.02 F
```

Example 4.4. In order to draw a body plan in en efficient manner a small Fortran program can be prepared. This program's main input is an offset file in the following format

OFFSET FILE

Length	Breadth	Draught	Depth
142.000000	19.086000	6.160000	13.838712
23	no of stations		
5	no of offsets		
0.000000	0.000000	5.550000	station 0
0.000000	2.100000	5.650000	
0.000000	3.800000	5.750000	
0.000000	4.700000	6.000000	
0.000000	5.066500	6.160000	
12			
7.101625	0.000000	4.638187	station 1
7.101625	0.425926	4.688814	
7.101625	1.880353	4.902474	
7.101625	2.977689	5.080120	
7.101625	3.881452	5.240041	
7.101625	4.643124	5.395631	
7.101625	4.984827	5.487795	
7.101625	5.307661	5.600055	
7.101625	5.615051	5.739171	
7.101625	5.902462	5.907385	
7.101625	6.163370	6.105809	
7.101625	6.223200	6.160000	

BODY PLAN

```
      IMPLICIT DOUBLE PRECISION (A-H,O-Z)
      DIMENSION NW(99),X(99,99),Y(99,99),Z(99,99)
      DIMENSION Y1(99), Z1(99), Y2(99), Z2(99)
      OPEN(UNIT=1,FILE='OFSET.DAT')
      OPEN(UNIT=7,FILE='BODY.SCR')
*********************************************************************
*     READ OFFSETS FROM DATA FILE                                  *
*********************************************************************
*     PL        : LENGTH                                           *
*     B         : BREADTH                                          *
*     T         : DRAUGHT                                          *
*     D         : DEPTH                                            *
*     NS        : NUMBER OF STATIONS                               *
*     NW        : NUMBER OF WATERLINES                             *
*     X(NS,NW)  : LONGITUDINAL POSITION OF STATIONS                *
*     Y(NS,NW)  : HALF BEAM FOR EACH OFFSET POINT                  *
*     Z(NS,NW)  : HEIGHT  FOR EACH OFFSET POINT FROM BASELINE      *
*********************************************************************
      READ(1,*)PL,B,T,D
      READ(1,*)NS
      DO I=1,NS
      READ(1,*)NW(I)
      DO J=1,NW(I)
      READ(1,*) X(I,J),Y(I,J),Z(I,J)
      ENDDO
      ENDDO
*     MIDSHIP SECTION
      NMID = 11
*     AUTOCAD PLOTTING ROUTINE
      GEN = 2.0*B
      YUK = 2.0*D
      WRITE(7,102)'LIMITS 0,0'
      WRITE(7,103) GEN,YUK
      WRITE(7,104)'ZOOM'
      WRITE(7,105)'A'
*     PLOT WATERLINES
      WRITE(7,107)'COLOR'
      WRITE(7,101)'YELLOW'
      WRITE(7,107)'PLINE'
      DO J=1,NW(NMID)
      YW1 = B-B/2.-B/15.
      YW2 = B+B/2.+B/15.
      ZW1 = Z(NMID,J) + T/2.
      WRITE(7,103) YW1,ZW1
      WRITE(7,103) YW2,ZW1
      WRITE(7,101)'PLINE'
      ENDDO
      YW1 = B
      ZW1 = T/2.
      ZW2 = T/2.+D
      WRITE(7,103) YW1,ZW1
      WRITE(7,103) YW1,ZW2
*     PLOT SECTIONS
      WRITE(7,101)'COLOR'
      WRITE(7,107)'WHITE'
      WRITE(7,107)'PLINE'
      DO I=1,NS
      DO J=1,NW(I)
      Y2(J) = B+Y(I,J)
      Z2(J) = Z(I,J)+T/2.
      IF(I.LE.NMID) Y2(J)=B-Y(I,J)
      ENDDO
      DO J=1,NW(I)
      WRITE(7,103)Y2(J),Z2(J)
      ENDDO
      WRITE(7,101)'PEDIT'
      WRITE(7,105)'L'
      WRITE(7,105)'F'
```

```
      WRITE(7,105)'W'
      WRITE(7,106)0.025
      WRITE(7,101)'PLINE'
      ENDDO
      WRITE(7,101)'REDRAW'
 100  FORMAT(I1)
 101  FORMAT(A6)
 102  FORMAT(A10)
 103  FORMAT(E10.5,',',E10.5)
 104  FORMAT(A4)
 105  FORMAT(A1)
 106  FORMAT(E10.5)
 107  FORMAT(A5)
      STOP
      END
```

This prgram generates the following script file

```
LIMITS 0,0
.38172E+02,.27677E+02
ZOOM
A
COLOR
YELLOW
PLINE
.82706E+01,.30800E+01
.29901E+02,.30800E+01
 PLINE
.19255E+02,.82257E+01
.19339E+02,.91543E+01
.19350E+02,.92400E+01


……….

 PEDIT
L
F
W
.25000E-01
 PLINE
REDRAW
```
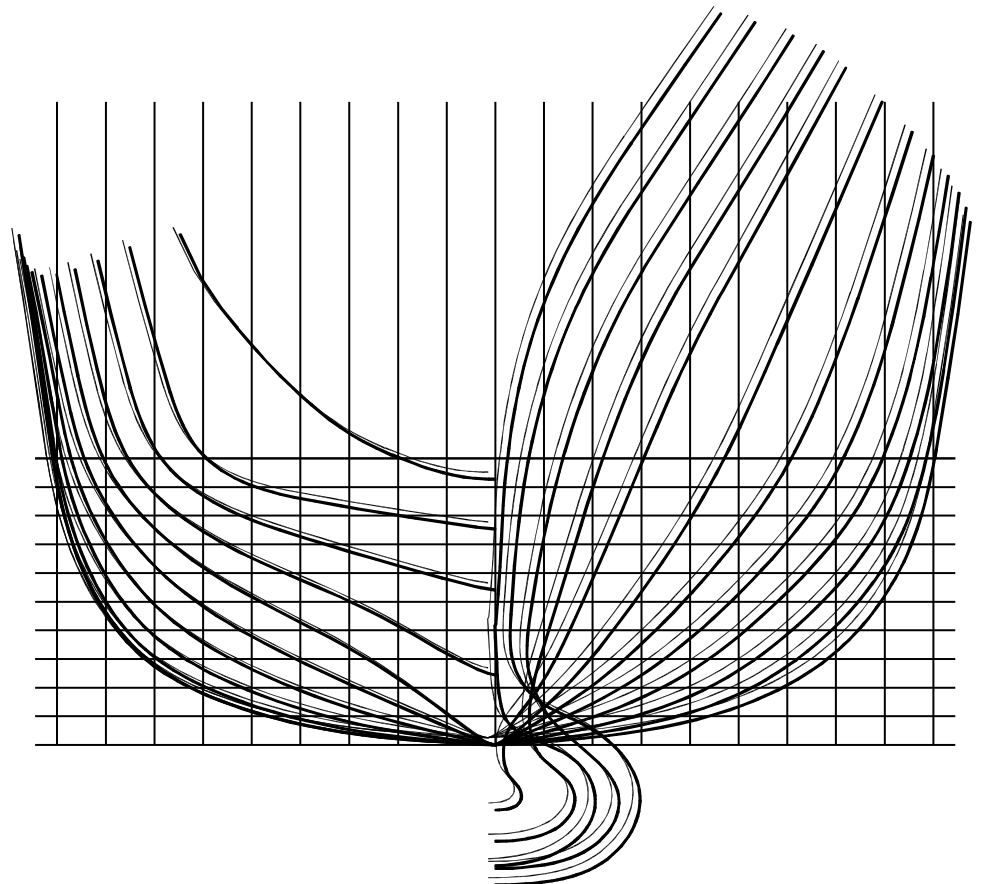
4.2.   Script File for Lines Plan Drawing

Example 4.5. In order to draw a lines plan in en efficient manner a small Fortran program can be prepared. This program's main input is an offset file in the following format

```
*********************************************************************
*     EXAMPLE45.FOR                                                 *
*********************************************************************
      IMPLICIT DOUBLE PRECISION (A-H,O-Z)
      DIMENSION X(99,99),Y(99,99),Z(99,99)
      DIMENSION WAX(99),WAY(99),WAZ(99),WFX(99),WFY(99),WFZ(99)
      DIMENSION Y1(99), Z1(99), X2(99), Y2(99), Z2(99)
      OPEN(UNIT=1,FILE='EXAMPLE45.DAT')
      OPEN(UNIT=8,FILE='EXAMPLE45.SCR')
*********************************************************************
*     READ OFFSETS FROM DATA FILE                                   *
*********************************************************************
*     PL       : LENGTH                                             *
*     B        : BREADTH                                            *
*     T        : DRAUGHT                                            *
*     D        : DEPTH                                              *
*     NS       : NUMBER OF STATIONS                                 *
*     NW       : NUMBER OF WATERLINES                               *
*     X(NS,NW) : LONGITUDINAL POSITION OF STATIONS                  *
*     Y(NS,NW) : HALF BEAM FOR EACH OFFSET POINT                    *
*     Z(NS,NW) : HEIGHT  FOR EACH OFFSET POINT FROM BASELINE        *
*     WAX(NWA) : LONGITUDINAL POSITION OF AFT PROFILE               *
*     WAY(NWA) : HALF BEAM OF AFT PROFILE                           *
*     WAZ(NWA) : HEIGHT  OF AFT PROFILE FROM BASELINE               *
*     WFX(NWF) : LONGITUDINAL POSITION OF FORE PROFILE              *
*     WFY(NWF) : HALF BEAM OF FORE PROFILE                          *
*     WFZ(NWF) : HEIGHT OF FORE PROFILE FROM BASELINE               *
*********************************************************************
      READ(1,*)PL,B,T,D
      READ(1,*)NS,NW
      DO I=1,NS
      DO J=1,NW
      READ(1,*) X(I,J),Y(I,J),Z(I,J)
      ENDDO
      ENDDO
*     READ WATERLINE ENDINGS
      DO I=1,NW
      READ(1,*)WAX(I),WAY(I),WAZ(I)
       ENDDO
      DO I=1,NW
      READ(1,*)WFX(I),WFY(I),WFZ(I)
      ENDDO
      NMID = 11
      NWL  =  9
      XXX = D/2.
      BOY = 1.2*PL
      YUK = XXX+B/2.+XXX+D+XXX+D+XXX
      WRITE(8,102)'LIMITS 0,0'
      WRITE(8,103)BOY,YUK
      WRITE(8,104)'ZOOM'
      WRITE(8,105)'A'
*****************************************
*     BODY PLAN
*****************************************
*     BASELINE
      WRITE(8,107)'PLINE'
      YW1 = 0.6*PL-0.5*B*1.05
      YW2 = 0.6*PL+0.5*B*1.05
      ZW1 = XXX+B/2.+XXX+D+XXX
      WRITE(8,103) YW1,ZW1
      WRITE(8,103) YW2,ZW1
*     LOADED WATERLINE
      WRITE(8,*)'PLINE'
      YW1 = 0.6*PL-0.5*B*1.05
      YW2 = 0.6*PL+0.5*B*1.05
```

```
        ZW1 = T+XXX+B/2.+XXX+D+XXX
        WRITE(8,103) YW1,ZW1
        WRITE(8,103) YW2,ZW1
*       WATERLINES
        DO J=1,NWL
        WRITE(8,*)'PLINE'
        YW1 = 0.6*PL-0.5*B*1.05
        YW2 = 0.6*PL+0.5*B*1.05
        ZW1 = FLOAT(J)*D/FLOAT(NWL)+XXX+B/2.+XXX+D+XXX
        WRITE(8,103) YW1,ZW1
        WRITE(8,103) YW2,ZW1
        ENDDO
*       CENTRELINE
        WRITE(8,*)'PLINE'
        XW1 = 0.6*PL
        ZW1 = XXX+B/2.+XXX+D+XXX
        ZW2 = ZW1 + D
        WRITE(8,103) XW1,ZW1
        WRITE(8,103) XW1,ZW2
*       PLOT SECTIONS
        WRITE(8,101)'COLOR'
        WRITE(8,107)'WHITE'
        WRITE(8,107)'PLINE'
        DO I=1,NS
        IF (I.GT.1) WRITE(8,101)'PLINE'
        DO 10 J=1,NW
        Y2(J) = 0.6*PL+Y(I,J)
        Z2(J) = Z(I,J)+XXX+B/2.+XXX+D+XXX
 10     IF(I.LE.NMID) Y2(J)=0.6*PL-Y(I,J)
        DO J=1,NW
        WRITE(8,103)Y2(J),Z2(J)
        ENDDO
        WRITE(8,101)'PEDIT'
        WRITE(8,105)'L'
        WRITE(8,105)'S'
        WRITE(8,105)'W'
        WRITE(8,106)0.025
        ENDDO
*       BUTTOCK LINES
        DO K=1,9
        WRITE(8,*)'PLINE'
        BUT = FLOAT(K)*(B/18.)
        XW1=0.6*PL-BUT
        ZW1=XXX+B/2.+XXX+D+XXX
        ZW2=ZW1+D
        WRITE(8,103)XW1,ZW1
        WRITE(8,103)XW1,ZW2
        ENDDO
        DO K=1,9
        WRITE(8,*)'PLINE'
        BUT = FLOAT(K)*(B/18.)
        XW1=0.6*PL+BUT
        ZW1=XXX+B/2.+XXX+D+XXX
        ZW2=ZW1+D
        WRITE(8,103)XW1,ZW1
        WRITE(8,103)XW1,ZW2
        ENDDO
****************************************
***     PROFILE
****************************************
        XXX = D/2.
*       UPPER DECK
        WRITE(8,*)'PLINE'
        XW1 = WAX(NW)+0.1*PL
        ZW1 = WAZ(NW)+XXX+B/2.+XXX
        WRITE(8,103)XW1,ZW1
        DO I=1,NS
        XW1=X(I,NW)+0.1*PL
        ZW1=Z(I,NW)+XXX+B/2.+XXX
        WRITE(8,103)XW1,ZW1
        ENDDO
```

```
        XW1 = WFX(NW)+0.1*PL
        ZW1 = WFZ(NW)+XXX+B/2.+XXX
        WRITE(8,103) XW1,ZW1
*       STERN PROFILE
        WRITE(8,*)'PLINE'
        DO J=1,NW
        XW1=WAX(J)+0.1*PL
        ZW1=WAZ(J)+XXX+B/2.+XXX
        WRITE(8,103)XW1,ZW1
        ENDDO
*       BOW PROFILE
        WRITE(8,*)'PLINE'
        DO J=1,NW
        XW1=WFX(J)+0.1*PL
        ZW1=WFZ(J)+XXX+B/2.+XXX
        WRITE(8,103)XW1,ZW1
        ENDDO
*       KEEL LINE
        WRITE(8,*)'PLINE'
        XW1 = WFX(1)+0.1*PL
        ZW1 = WFZ(1)+XXX+B/2.+XXX
        WRITE(8,103)XW1,ZW1
        XW1 = WAX(1)+0.1*PL
        ZW1 = WAZ(1)+XXX+B/2.+XXX
        WRITE(8,103)XW1,ZW1
*       BASELINE
        WRITE(8,*)'PLINE'
        XW1 = 0.05*PL
        XW2 = 1.15*PL
        ZW1 = XXX+B/2.+XXX
        WRITE(8,103)XW1,ZW1
        WRITE(8,103)XW2,ZW1
*       LOADED WATERLINE
        WRITE(8,*)'PLINE'
        XW1 = 0.05*PL
        XW2 = 1.15*PL
        ZW1 = T+XXX+B/2.+XXX
        WRITE(8,103)XW1,ZW1
        WRITE(8,103)XW2,ZW1
*       WATERLINES
        DO J=1,NWL
        WRITE(8,*)'PLINE'
        XW1 = 0.05*PL
        XW2 = 1.15*PL
        ZW1 = FLOAT(J)*D/FLOAT(NWL)+XXX+B/2.+XXX
        WRITE(8,103)XW1,ZW1
        WRITE(8,103)XW2,ZW1
        ENDDO
*       SECTION LINES
        ZW1=XXX+B/2.+XXX
        ZW2=ZW1+D
        DO I=1,NS
        WRITE(8,*)'PLINE'
        XW1=X(I,1)+0.1*PL
        WRITE(8,103)XW1,ZW1
        WRITE(8,103)XW1,ZW2
        ENDDO
****************************************
***   WATERLINES
****************************************
*       SECTION LINES
        ZW1=XXX
        ZW2=ZW1+D
        DO I=1,NS
        WRITE(8,*)'PLINE'
        XW1=X(I,1)+0.1*PL
        WRITE(8,103)XW1,ZW1
        WRITE(8,103)XW1,ZW2
        ENDDO
*       CENTRELINE
        XW1 = 0.05*PL
```

```
      XW2 = 1.15*PL
      ZW1 = XXX
      WRITE(8,*)'PLINE'
      WRITE(8,103)XW1,ZW1
      WRITE(8,103)XW2,ZW1
*     PLOT WATERLINES
      NS2 = NS+2
      DO J=1,NW
      X2(1)  =WAX(J)
      X2(NS2)=WFX(J)
      Y2(1)  =WAY(J)
      Y2(NS2)=WFY(J)
      DO I=2,NS+1
      X2(I) = X(I-1,J)
      Y2(I) = Y(I-1,J)
      ENDDO
      WRITE(8,*)'PLINE'
      DO I=1,NS2
      XW1 = X2(I) + PL*0.1
      YW1 = Y2(I) + XXX
      WRITE(8,103) XW1,YW1
      ENDDO
      WRITE(8,*)'PEDIT'
      WRITE(8,103)XW1,YW1
      WRITE(8,105)'S'
      ENDDO
 100  FORMAT(I1)
 101  FORMAT(A6)
 102  FORMAT(A10)
 103  FORMAT(E10.5,',',E10.5)
 104  FORMAT(A4)
 105  FORMAT(A1)
 106  FORMAT(E10.5)
 107  FORMAT(A5)

      STOP
      END
```

Offset data file used in this example is as follows:

```
    103.025      16.500     6.100       8.000
 30 17
        6.500       0.000      0.116 1
        6.500       0.614      0.500
        6.500       0.952      1.000
        6.500       1.121      1.500
        6.500       1.191      2.000
        6.500       1.185      2.500
        6.500       1.144      3.000
        6.500       1.165      3.500
        6.500       2.007      4.000
        6.500       4.716      4.500
        6.500       6.142      5.000
        6.500       6.933      5.500
        6.500       7.439      6.000
        6.500       7.741      6.500
        6.500       7.924      7.000
        6.500       8.036      7.500
        6.500       8.110      8.000
        9.750       0.224      0.000 2
        9.750       1.400      0.500
        9.750       1.788      1.000
        9.750       2.013      1.500
        9.750       2.130      2.000
        9.750       2.264      2.500
        9.750       2.780      3.000
        9.750       4.535      3.500
        9.750       6.083      4.000
        9.750       6.970      4.500
        9.750       7.535      5.000
        9.750       7.892      5.500
        9.750       8.093      6.000
        9.750       8.197      6.500
        9.750       8.243      7.000
```

4.9

```
            9.750        8.250       7.500
            9.750        8.250       8.000

      ...........................

          100.750        0.000       0.281 30
          100.750        0.254       0.500
          100.750        0.558       1.000
          100.750        0.796       1.500
          100.750        0.998       2.000
          100.750        1.187       2.500
          100.750        1.374       3.000
          100.750        1.529       3.500
          100.750        1.613       4.000
          100.750        1.599       4.500
          100.750        1.506       5.000
          100.750        1.352       5.500
          100.750        1.169       6.000
          100.750        1.094       6.500
          100.750        1.380       7.000
          100.750        1.917       7.500
          100.750        2.533       8.000
            7.068        0.000       0.000 STERN PROFILE
            4.751        0.000       0.500
            3.728        0.000       1.000
            2.956        0.000       1.500
            2.645        0.000       2.000
            2.645        0.000       2.500
            3.002        0.000       3.000
            3.483        0.000       3.500
            3.582        0.000       4.000
            3.334        0.000       4.500
            2.058        0.000       5.000
            0.000        0.000       5.500
           -2.275        2.223       6.000
           -2.275        3.741       6.500
           -2.275        5.319       7.000
           -2.275        5.736       7.500
           -2.275        6.143       8.000
           97.665        0.000       0.000 BOW PROFILE
          101.333        0.000       0.500
          102.808        0.000       1.000
          103.623        0.000       1.500
          104.268        0.000       2.000
          104.809        0.000       2.500
          105.131        0.000       3.000
          105.352        0.000       3.500
          105.480        0.000       4.000
          105.525        0.000       4.500
          105.502        0.000       5.000
          105.350        0.000       5.500
          104.985        0.000       6.000
          104.008        0.000       6.500
          103.099        0.000       7.000
          103.329        0.000       7.500
          103.561        0.000       8.000
```
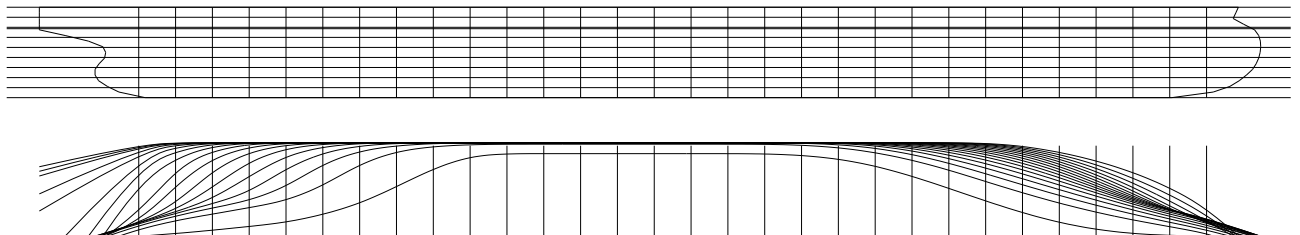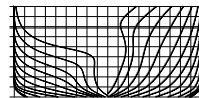
Exercise 4. Prepare a script file for lines plan of a fishing vessel with following nondimensional offsets. Main dimensions of the vessel are given as follows:

		Length	Breadth	Draught	Depth
80020115	Doğa Paksoy	30	9	3	4.8
80040106	Hüseyin Sağlam	34	10	3.5	5.6
80040117	Günışığı Uslu	38	11	4	6.4
80040119	Oğuz Erman	42	12	4.5	7.2
80040120	Dilara Altın	46	13	5	8.0
80040121	Can Şimşek	50	14	5.5	8.8
80040129	Tağmaç Gürev	54	15	6	9.6
80040304	Ahmet I Erdeve	58	16	6.5	10.4
80050103	Salih Fidan	62	17	7	11.2
80050104	Itır İpek Köksal	66	18	7.5	12.0
80050105	Necati Yasin Göksal	70	19	8	12.8
80050112	Mustafa Kaan Kaşıkçı	30	8	3	4.8
80050123	Cuneyt Kumluk	34	9	3.5	5.6
80050132	Meral Tuna	38	10	4	6.4
990084201	Aleksandra Anna Jankiewicz	42	11	4.5	7.2
990084202	Elzbieta Jung	46	12	5	8.0

Sta	WL 0.0	WL 0.1	WL 0.2	WL 0.3	WL 0.4	WL 0.6	WL 0.8	WL 1.0	WL 1.2	WL 1.4	WL 1.6
0.5	0.000	0.022	0.028	0.032	0.050	0.060	0.187	0.505	0.741	0.860	0.913
0.75	0.000	0.040	0.059	0.071	0.093	0.137	0.298	0.592	0.790	0.889	0.933
1.0	0.000	0.060	0.092	0.117	0.143	0.222	0.400	0.663	0.835	0.915	0.951
1.5	0.000	0.113	0.173	0.225	0.272	0.406	0.592	0.786	0.901	0.951	0.976
2.0	0.000	0.178	0.276	0.351	0.422	0.575	0.744	0.875	0.943	0.975	0.990
2.5	0.000	0.256	0.395	0.487	0.568	0.716	0.852	0.933	0.974	0.991	0.998
3.0	0.000	0.348	0.509	0.612	0.694	0.823	0.919	0.971	0.992	0.999	1.000
4.0	0.000	0.534	0.725	0.821	0.886	0.956	0.988	1.000	1.000	1.000	1.000
5.0	0.000	0.658	0.853	0.930	0.970	0.998	1.000	1.000	1.000	1.000	1.000
6.0	0.000	0.576	0.766	0.847	0.890	0.940	0.966	0.979	0.988	0.995	1.000
7.0	0.000	0.362	0.499	0.587	0.651	0.738	0.802	0.854	0.900	0.938	0.970
7.5	0.000	0.259	0.374	0.452	0.520	0.611	0.680	0.750	0.815	0.871	0.926
8.0	0.000	0.173	0.262	0.326	0.381	0.467	0.546	0.624	0.700	0.776	0.852
8.5	0.000	0.105	0.169	0.216	0.258	0.332	0.407	0.480	0.562	0.650	0.742
9.0	0.000	0.049	0.089	0.123	0.152	0.205	0.262	0.326	0.401	0.486	0.583
9.25	0.000	0.025	0.054	0.080	0.104	0.146	0.192	0.248	0.318	0.393	0.490

Stern Profile

	WL 0.0	WL 0.1	WL 0.2	WL 0.3	WL 0.4	WL 0.6	WL 0.8	WL 1.0	WL 1.2	WL 1.4	WL 1.6
x	0.500	0.500	0.500	0.500	0.500	0.482	0.164	-0.245	-0.403	-0.466	-0.500
y	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.580	0.750	0.800

Bow Profile

	WL 0.0	WL 0.1	WL 0.2	WL 0.3	WL 0.4	WL 0.6	WL 0.8	WL 1.0	WL 1.2	WL 1.4	WL 1.6
x	9.000	9.258	9.383	9.450	9.550	9.650	9.750	9.850	9.950	10.050	10.150
y	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000