

INTERNAL REPORT 54

PLØTCAL - A PACKAGE OF SUBROUTINES TO AID IN ORGANIZING AND ATTACHING CALCOMP GRAPHICS TO EXISTING PROGRAMS AND SIMULATIONS

ABSTRACT

PLØTCAL is a subroutine package to aid in organizing and attaching Calcomp graphics to existing programs and simulations. PLØTCAL is self-contained, requiring additional card input and a binary data file from the generating program.

DESCRIPTION

PLØTCAL is a package of two major subroutines, GRAPH50 and GRAPH52, that aid in organizing and attaching Calcomp graphics to existing programs. PLØTCAL is controlled by input from TAPE8 and finds the data generated by the program from TAPE7.

TAPE7 is written from the program using the FORTRAN binary WRITE statement. Two possible record structures are allowed:

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WRITE(7)((X(I),Y(I)),I=1,N) or  
WRITE(7)((ISYM(I),X(I),Y(I)),I=1,N) where the
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lth data point is the ordered pair $(X(I),Y(I))$, and $ISYM(I)$ is the symbol used to mark the data point. See Figure 2, p. 32, Link (1971), for the symbol number correspondence. Two new numbers are allowed when using PLØTCAL; 80 if no symbols are desired, and 81 if symbols are to be read with the data from TAPE7.

Subroutine GRAPH50 reads TAPE8 and checks for obvious errors and stops execution if an error occurs. TAPE8 is rewound, then entry GRAPH51 of subroutine GRAPH50 is called, which reads TAPE8 and executes plotting.

TAPE8 is a card image file. The format for each card image is:

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Columns 1 - 5: Identifying label  
Columns 6 - 80: Information
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Numbers are free field, however care must be taken to place decimals in nonintegers and leave decimals out of integers. Table 1 lists and defines the labels and the corresponding actions initiated by PLØTCAL.

REFERENCES

LINK, D. 1971. Numerical plotting system users manual. Univ. Wash. Comput. Cent. Publ. W00053. Univ. Washington, Seattle. 73 p.

Table 1. PLØTCAL input description.

Label	Definition	Instruction	Example
COMNT	Comment card	Skip to the next card	COMNT THIS IS A COMMENT CARD
CAL	Calcomp card	Produce Calcomp plots	CAL
PRINT	Line printer card	Produce line printer plots	PRINT
RECRD	Record card	Select the records that follow in the order of their appearance	RECRD 1 3 5 7 9 (default no records)
PNTS	Points card	Defines the number of points in the corresponding records given in the record card	PNTS 50 50 50 50 50
TICK	Tick card	Instructs PLØTCAL as to which symbols should be used to mark the data from the corresponding records listed in the record card. The integers correspond to the symbols according to page 32 of Link (1971). In addition: 80 - no ticks 81 - symbols are with data on TAPE7.	TICK 81 15 40 60 64 (default: 80 no ticks)
LINE	Line card	Type of line to be drawn between the data points. The instruction is a two-digit integer. The first digit is: 0 to draw a straight line between points 1 to draw a parabolic fitted line between points	LINE 00 12 13 00 00

Table 1. PLOTAL input description (cont.)

Label	Definition	Instruction	Example
		The second digit is: 0 don't draw lines between points 1 draw a solid line 2 draw a dashed line 3 draw a dotted line	
TITLE	Title card	Insert a line of the title (maximum of 10 title cards allowed)	TITLELOGISTIC FIT TO GROWTH
LABY	Y-axis label card	Insert a line into the Y-axis label (maximum of 10 Y-axis label cards allowed)	LABY HEIGHT. (CM.)
LABX	X-axis label card	Insert a line into the X-axis label (maximum of 10 X-axis label cards allowed)	LABX TIME. (CM.)
KEY	Key card	Insert a line into the key (maximum of 200 key cards allowed)	KEY KEY KEY DESCRIPTION SYMBOL
SUBLABELS			
KEY SIZE:		Reset character height to the new value (number is the height in inches) size: must begin in Col. 6	KEY SIZE: .07 (default: same as height for date symbols)
M			
L 2 spaces			
KEY XDST:		Reset the distance from the left edge of the plotting area to the start of the key line to the new value (number is distance in inches) XDST: must begin in Col. 6	KEY XDST: 3 (default: Same as the distance from the left edge to the Y axis)
M			
L 2 spaces			

Table 1. PLØTCAL input description (cont.)

Label	Definition	Instruction	Example
KEY	YDST:	Reset the distance from the bottom of the plotting area to the line of key (number is the distance in inches) YDST: must begin in Col. 6	KEY YDST:8. (default is calculated so that key appears as in the sample output)
CHARH	Title height card	Set the character height in inches for the title lettering	CHARH .14 (default: .14)
CHARL	Label height card	Set the character height in inches for the label lettering	CHARH .105 (default: .105)
CHARD	Data height card	Set the character height in inches for the symbols that mark the data points	CHARD .1 (default .105)
SIZE	Size card	Sets the boundaries for the graph. The labels are written outside the graph but in the plotting area. The first number is the distance from the left plotting boundary to the Y axis. The second number is the distance from the left plotting boundary to the end of the X axis. The third number is the distance from the bottom plotting boundary to the X axis. The fourth number is the distance from the bottom plotting boundary to the end of the Y axis.	SIZE 1.25 8 2.5.9. (default is 1.25 7.5 2.5 9.5)

Table 1. PLØTCAL input description (cont.)

Label	Definition	Instruction	Example
END	End card	Instructs PLØTCAL to produce and label one graph. Then the paper is advanced to a new page for the instructions that follow.	
ISKP	Skip card	Indicates which data points in the corresponding record to tick with symbols. Each record uses two integers of the skip card. These become I1 and I2 of the statement DO 100 I = I1,N,I2 where statement 100 ticks the points and N is the number of points in the record.	ISKP 1 1 3 5 5 5 2 5 4 5 (default is all 1's)

Table 2. PLOTAL sample deck

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JOB CARD, T30, CM630005          NAME
ACCØUNT (12345678, PASSWRD)
REQUEST, TAPE99VSN=PLØT, S, HI.
COPYBR (INPUT, TAPE8) ATTACH (PLØTCAL, ID=HAMERLY)
REWIND (TAPE8)
FORTRAN.
LGØ.
UNLOAD (TAPE99)
- END OF RECORD CARD. A 7-8-9 PUNCH IN COLUMN 1.
COMNT
COMNT THESE CARDS WILL THE END OF RECORD CARD ARE THE PLOTAL INSTRUCTION CARDS.
COMNT THESE CARDS ARE COPIED TO TAPE8. THE CONTROL LABEL IN COLUMNS 1 THROUGH 5
COMNT INDICATES THE INSTRUCTION THAT PLOTAL IS TO EXECUTE WITH THE INFORMATION
COMNT CONTAINED IN COLUMNS 6 THROUGH 80.
COMNT CONTROL LABEL COMNT INSTRUCTS PLOTAL THAT THE CARD IS A COMMENT CARD
COMNT WHICH IS COMPLETELY IGNORED BY PLOTAL.
COMNT
COMNT THE PRINT LABEL INSTRUCTS PLOTAL TO PRODUCE LINE PRINTER PLOTS
COMNT (DEFAULT NO PLOTS)
COMNT
COMNT THE CAL LABEL INSTRUCTS PLOTAL TO PRODUCE CALCOMP PLOTS.
CAL
COMNT
COMNT THE INTEGERS ON THE RECRD CARD ARE THE RECORD NUMBERS TO BE PLOTTED.
COMNT (DEFAULT NO RECORDS)
RECRD 1 2 3 4
COMNT
COMNT THE PNTS CARD INSTRUCTS PLOTAL TO THE NUMBER OF DATA POINTS IN EACH
COMNT RECORD TO BE PLOTTED. THESE NUMBERS MUST BE NONDECIMAL INTEGERS.
PNTS 10 50 50 20
COMNT
COMNT THE TICK CARD INSTRUCTS PLOTAL WHICH TICKS SHOULD BE USED IN EACH
COMNT OF THE RECORDS TO BE PLOTTED. THE INTEGERS CORRESPOND TO SYMBOLS
COMNT ACCORDING TO PAGE 32 OF THE NPS MANUAL. IN ADDITION TO THESE
COMNT 80 IS USED TO DENOTE NO TICKS AND 81 IS
COMNT USED TO DENOTE THAT THE SYMBOL IS RECORDED IN THE RECORD BEFORE THE
COMNT ORDERED PAIR, I. E., THAT RECORD WAS WRITTEN.
COMNT WRITE (7) ((ISYM(1)), 1=1, N)
COMNT (DEFAULT NO TICKS 80)
TICK 81 15 40 64
COMNT
COMNT THE LINE CARD INSTRUCTS PLOTAL AS TO THE TYPE OF LINE TO BE DRAWN BETWEEN
COMNT POINTS. THE FIRST DIGIT OF THE INTEGER IS:
COMNT 0 - INSTRUCTS PLOTAL TO DRAW A STRAIGHT LINE BETWEEN POINTS.
COMNT 1 - INSTRUCTS PLOTAL TO DRAW A PARABOLIC FITTED LINE THROUGH THE
COMNT POINTS.
COMNT THE SECOND DIGIT OF THE INTEGER IS:
COMNT 0 - DONT DRAW THE LINE.
COMNT 1 - DRAW A SOLID LINE.
COMNT 2 - DRAW A DASHED LINE.

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Table 2. PLOTAL sample deck (cont.).

COMNT 3 - DRAW ONLY DOTS AT THE DATA POINTS.
 COMNT 00 OR 10 PRODUCE NO LINE. (DEFAULT NO LINES DRAWN)
 LINE 0 12 11 13
 COMNT
 COMNT ISKP INSTRUCTS PLOTAL AS TO WHICH DATA POINTS IN THE RECORD TO TICK WITH
 COMNT SYMBOLS. EACH RECORD USES TWO INTEGERS OF THE ISKP CARD. THESE BECOME
 COMNT 11 AND 12 OF THE STATEMENT DO 100 I = 11,N,12, WHERE 100 TICKS THE
 COMNT POINTS AND N IS THE NUMBER OF POINTS IN THE RECORD. (DEFAULT IS ALL 15)
 ISKP 11 19 49 79
 COMNT
 COMNT UP TO 10 LINES FOR THE TITLE MAY BE ENTERED IN ORDER WITH THE TITLE LABEL.
 TITLE LOGISTIC FIT TO SEEDLING GROWTH DATA.
 COMNT
 COMNT UP TO 10 LINES FOR THE Y AXIS LABEL MAY BE ENTERED IN ORDER WITH THE
 COMNT LABY LABEL.
 LABY HEIGHT (CM)
 COMNT
 COMNT UP TO 10 LINES FOR THE X AXIS LABEL MAY BE ENTERED IN ORDER WITH THE LABX
 COMNT LABEL.
 LABX TIME (DAYS)
 COMNT
 COMNT UP TO 200 LINES TO FORM THE KEY MAY BE ENTERED IN ORDER BY THE KEY LABEL.
 KEY SIZE: .105
 KEY XDST: 3.
 KEY KEY
 KEY DESCRIPTION SYMBOL
 KEY DATA POINTS *
 KEY FITTED LINE SOLID LINE
 KEY 75 PCT. CONFID. OTHER LINES.
 COMNT
 COMNT SIZE9 INDICATES THE HEIGHT IN INCHES TO WHICH THE LABELING IS TO BE CHANGED.
 COMNT XDST9 INDICATES THE DISTANCE IN INCHES FROM THE LEFT SIDE OF THE PLOTTING
 COMNT TO THE START OF THE KEY LINE. (NOT THE Y AXIS.) (DEFAULT IS THE Y AXIS
 COMNT DISTANCE).
 COMNT
 COMNT THE CHARH CARD SETS THE HEIGHT IN INCHES OF THE TITLE LETTERING.
 COMNT (DEFAULT IS .14)
 CHARH .14
 COMNT
 COMNT THE CHARD CARD SETS THE HEIGHT IN INCHES OF THE DATA AND KEY LETTERING.
 COMNT (DEFAULT IS .105)
 CHARD .105
 COMNT
 COMNT THE CHARL CARD SETS THE HEIGHT IN INCHES OF THE X AND Y AXIS NUMBERS AND
 COMNT LABELS. (DEFAULT IS .105)
 CHARL .105
 COMNT
 COMNT ALL LETTERING SIZES SHOULD BE IN INCREMENTS OF .035 INCH.
 COMNT
 COMNT THE SIZE CARD SETS THE SIZE OF THE GRAPH AREA IN THE PAGE. THE SIZE CARD
 COMNT HAS FOUR DECIMAL NUMBERS.
 COMNT FIRST NUMBER = DISTANCE FROM LEFT EDGE OF PAPER TO THE Y AXIS.
 COMNT SECOND NUMBER = DISTANCE FROM LEFT EDGE OF PAPER TO THE END OF Y AXIS
 COMNT THIRD NUMBER = DISTANCE FROM BOTTOM EDGE TO X AXIS.
 COMNT FOURTH NUMBER = DISTANCE FROM BOTTOM EDGE TO THE TOP OF THE X AXIS.

Table 2. PLOTICAL sample deck (cont.).

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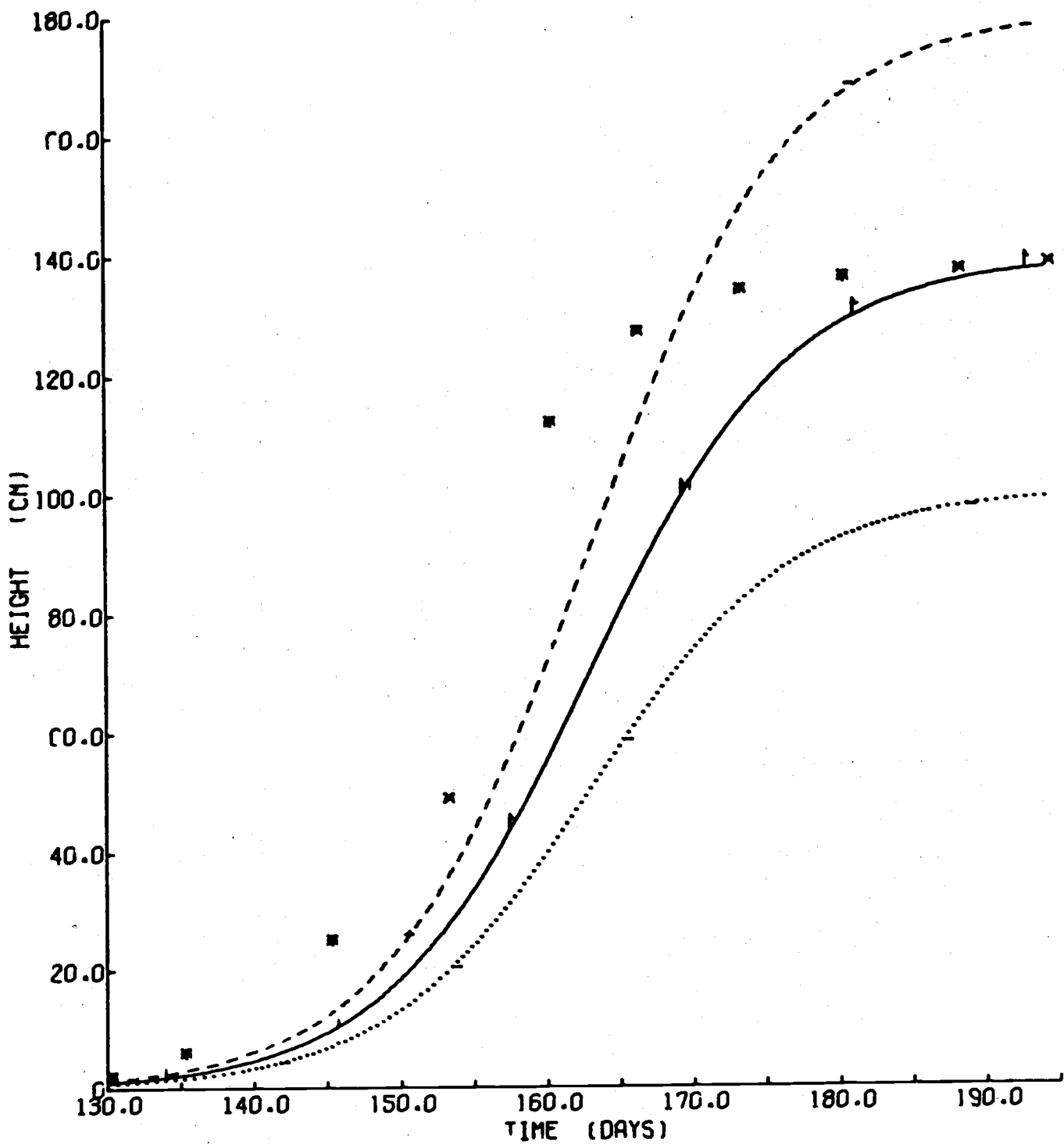
COMNT (DEFAULT IS 1.25 7.5 2.5 9.5 )
SIZE 1.25 7.5 2.5 9.5
COMNT
COMNT THE END CARD INSTRUCTS PLOTICAL TO PRODUCE A GRAPH WITH LABELS, RESET ALL
COMNT DEFAULT VALUES, AND ADVANCE TO A NEW PAGE FOR FURTHER GRAPHING.
END
SIZE 1.25 8. 10. 10.1
CHARD .07
KEY SIZE: .105
KEY XDST: 1.25
KEY
KEY OBJECTIVES OF PLOTICAL
KEY A. PROVIDE A GRAPHICS SYSTEM TO ATTACH CALCOMP OUTPUT TO
KEY EXISTING PROGRAMS
KEY
KEY B. PROVIDE A METHOD OF LETTERING TO PRODUCE OVERLAYS FOR
KEY THE PRESENTATION OF PAPERS.
KEY XDST: 1.75
KEY 1. ALLOW DYNAMIC INDENTATION.
KEY SIZE: .14
KEY 2. ALLOW CHARACTER SIZE MANIPULATION.
END
- END OF RECORD CARD. A 7-8-9 PUNCH IN COLUMN 1.
PROGRAM TEST(INPUT,OUTPUT,TAPE7,TAPE8,TAPE99,TAPE5=INPUT,TAPE6=
2OUTPUT)
C
C PURPOSE - TEST DEMONSTRATES THE PROPER USE OF PLOTICAL.
C
DIMENSION X(100),Y(100),ISYM(100),IFM(8)
DIMENSION P(3)
DATA(P(1),I=1,3)/100.,139.,180./
C
C CALL GRAPHSO TO ENSURE CORRECT PLOTICAL INPUT BEFORE EXECUTION.
CALL GRAPHSO
C
C READ FORMAT CARD
READ(5,100)IFM
100 FORMAT(8A10)
C
C READ DATA TILL END OF FILE.
N = 0
5 N = N + 1
READ(5,IFM) ISYM(N),X(N),Y(N)
IF(EOF,5)10,5
10 CONTINUE
N = N- 1
C
C PREPARE FIRST RECORD OF TAPE7
WRITE(7)((ISYM(I),X(I),Y(I)),I=1,N)
C
C GENERATE DATA TO PLOT LINES.
DO 30 I = 1,3
DO 29 J = 1,50

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Table 2. PLOTAL sample deck (cont.).

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X(J) = 130. + 64.*(FLOAT(J-1)/49.)
IF(1.EQ.3)X(J) = 130. + 64.*(FLOAT(J-1)/19.)
Y(J) = P(1)/(1.+EXP(23.608 -.145*X(J)))
IF(1.EQ.3.AND.J.EQ.20)GO TO 31
29 CONTINUE
31 CONTINUE
WRITE(7)((X(K),Y(K)),K=1,J)
30 CONTINUE
C
C CALL GRAPHSI TO INITIATE PLOTTING.
CALL GRAPHSI
STOP
END
- END OF RECORD CARD. A 7-8-9 PUNCH IN COLUMN 1.
(12,3X,2F5.0)
66 130. 1.
66 135. 5.
66 145. 24.
66 153. 48.
66 160. 111.
66 166. 126.
66 173. 133.
66 180. 135.
66 188. 136.
66 194. 137.
- END OF RECORD CARD. A 7-8-9 PUNCH IN COLUMN 1.
  BINARY DECK OF PLOTAL.
- END OF JOB CARD. A 6-7-8-9 PUNCH IN COLUMN 1.
```

LOGISTIC FIT TO SEEDLING GROWTH DATA



KEY	SYMBOL
DESCRIPTION	
DATA POINTS	x
FITTED LINE	SOLID LINE
75 PCT. CONFID.	OTHER LINES