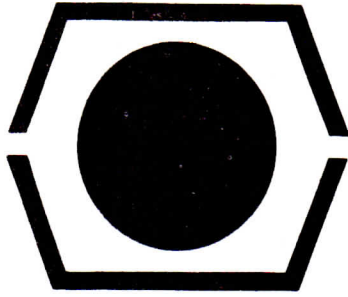


FOCAL8-LIB-2
8-523



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DECUS NO.	FOCAL8-126
TITLE	PLOTTER
AUTHOR	John W. Smith
COMPANY	Indiana University Bloomington, Indiana
DATE	September 3, 1970
SOURCE LANGUAGE	FOCAL-69

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PLOTTER

DECUS Program Library Write-up

DECUS NO. FOCAL8-126

"PLOTTER" is a FOCAL program which allows one to utilize the teletype to plot a wide variety of equations. The equation is entered as a FOCAL "SET" command in line number $\emptyset 3.2\emptyset$, and is of the form "SET Y=F(X)". The function of X may be linear or nonlinear, and may contain all of the special FOCAL functions.

The program asks the limits of X which are to be included in the plot and generates scaling information to place all the data on the graph with maximum resolution. The independent variable (X) is plotted vertically on the teletype by "line-feed", and will always occupy 50 increments or 8.5 inches. The dependent variable (Y) is plotted horizontally by teletype "space", and occupies 70 spaces or 7 inches.

The plot may be offset from zero by any amount. If zero falls within the limits of the graph it is indicated on the Y axis. In addition, the points are represented by "+", "-", or " \emptyset " depending upon the polarity and magnitude of the Y variable.

PLOTTER RESTRICTIONS

1. The initial X must always be less than the final X.
2. All angles used with the FOCAL trig functions must be in radians. To convert degrees to radians, multiply by "RC". (RC=3.14159/180)

PLOTTER SYMBOLS

- I A counter, used internally in "FOR" statements.
- J A counter, used internally in "FOR" statements.
- R A counter; changes every tenth X axis marker from a "." to a "*".
- RC Converts degrees to radians. RC=3.14159/180
- V The number of spaces required to represent the current value of Y.
- X The independent variable; represented by "line-feed".
- XI Scale for X axis; one teletype line-feed equals XI units.
- XL The last value of X for which the equation is to be solved.
- XØ The first value of X for which the equation is to be solved.
- Y The dependent variable; represented by "space".
- YI Scale for the Y axis; one teletype space equals YI units.
- YM Maximum value of Y within the range $Y=F(XØ)$ to $Y=F(XL)$.
- YN Minimum value of Y within the range $Y=F(XØ)$ to $Y=F(XL)$.
- YS Maximum value to Y scale.

E A
W A
C-FOCAL, 1969

01.20 T !!!!!, %6.04; E
01.22 T "PUT EQUATION IN 03.20; OF THE FORM '3.2 SET Y=F(X)', !
01.24 T "THEN START AT 01.28, WITH A 'GO 1.28'", !!
01.26 Q
01.28 T !; S RC=3.14159/180
01.30 A "INITIAL X ", X0, !
01.32 A "FINAL X ", XL, !!
01.34 T "X INCREMENT ", (XL-X0)/50
01.36 A " X SCALE ", XI, !!
01.38 S X=XL; D 3; S YN=Y; S X=X0; D 3; S YM=Y
01.40 F I=0, 50; S X=I*XI+X0; D 3; D 6
01.42 T "MAXIMUM Y ", YM, !, "MINIMUM Y ", YN, !!
01.44 A "INITIAL Y COORDINATE ", YO, !!
01.46 T "Y INCREMENT ", (YM-Y0)/70
01.48 A " Y SCALE ", YI, !!
01.50 S YS=YI*70+(YO)
01.60 T " *, %6.04, YO, "
01.62 T " ", YS, " ", !
01.64 D 7

02.20 F I=0, 50; S X=I*XI+X0; D 3; D 4; D 5
02.22 D 7
02.30 Q

03.20 SET Y=70

04.10 S R=R+1
04.12 IF (R-10) 4.14, 4.16, 4.16
04.14 T ". "; G 4.17
04.16 T " "; S R=0
04.17 S V=FITR(FABS(Y/YI-Y0/YI))
04.18 I (V) 4.2, 4.22, 4.2
04.20 F J=1, V; T " "
04.22 R

05.20 IF (Y) 5.32, 5.34, 5.36
05.32 T "- ", !; R
05.34 T "0 ", !; R
05.36 T "+ ", !; R

06.20 I (Y-YM) 6.3, 6.24, 6.24
06.24 S YM=Y
06.30 I (Y-YN) 6.34;
06.32 R
06.34 S YN=Y; R

07.20 T " *.....*.....*.....*.....*"
07.22 T ".....*.....*.....*", #
07.24 I (YS) 7.32;
07.26 I (-Y0) 7.32;
07.28 F I=Y0, YI, 0; T " "
07.30 T "0"
07.32 T !; S R=10

*

PUT EQUATION IN 03.20; OF THE FORM '3.2 SET Y=F(X)'
THEN START AT 01.28, WITH A 'GO 1.28'

*3.2 SET Y=10*FEXP(-.003*X)*FCOS(RC*X)
*GO 1.28

INITIAL X :0
FINAL X :1440

X INCREMENT = 28.8000 X SCALE :30

MAXIMUM Y = 10.0000
MINIMUM Y = - 5.8275

INITIAL Y COORDINATE :-10

Y INCREMENT = 0.2857 Y SCALE :.3



