



hp calculators

HP 49G+ Working with Fast 3D Plots

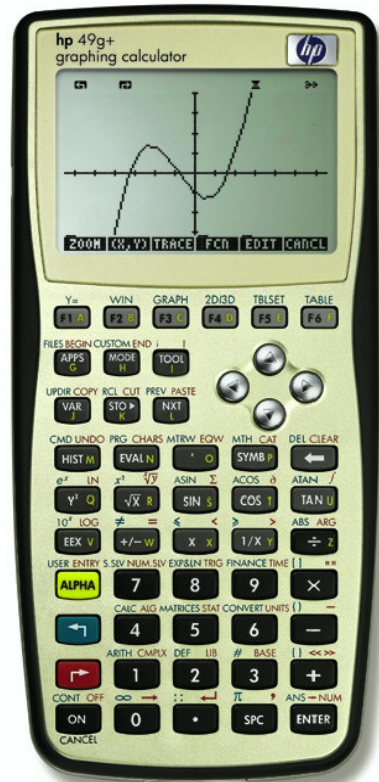
Plotting on the HP 49G+

The 2D/3D (PLOT SETUP) Form

The Y= Form

The WIN Form

Examples of Fast3D Plotting



Plotting on the HP 49G+

The HP 49G+ calculator provides a host of plots to allow the user to visualize data or relationships between them. The GREEN shifted functions of the top row of keys on the HP 49G+ allow access to many of the input forms where plotting specifications may be entered.

The 2D/3D (PLOT SETUP) Form

The 2D/3D (PLOT SETUP) Form is accessed from the LEFT shifted function of the $\boxed{F4}$ key by pressing and **holding down** $\boxed{\leftarrow}$ and then pressing $\boxed{F4}$, to access $\boxed{2D/3D}$. When pressed, a form is displayed with a number of choices related to plotting.

Figure 1

The first choice deals with choosing the plot type. The selections for plot type are displayed by pressing $\boxed{F2}$, which has the label \boxed{TYPE} right above it. The plot types include plotting functions, polar plots, parametric plots, differential equation plots, conic plots, truth plots, histograms, bar charts, scatter charts, slopefield charts, fast 3D charts, wireframe plots, Ps-contour plots, Y-slice plots, gridmap plots, and Pr-surface plots. A CHOOSE Box appears as shown below.

Figure 2

The Plot Setup form also allows the user to specify the equation being plotted if the cursor is placed on the EQ: field and the \boxed{EQ} menu label is pressed – this invokes the EquationWriter to allow for the construction of the equation to be plotted. The form also allows the angle measure used and the independent variable to be specified. In addition, several check boxes that are used to indicate whether the plotted points should be automatically connected together by the calculator and the horizontal and vertical tick marks used for the graph. The form also allows for the plotting of more than one function at a time.

The Y= Form

The Y= form provides another way to enter your equation or function to plot. Press and **hold down** $\boxed{\leftarrow}$ and then press $\boxed{F1}$, which is $\boxed{Y=}$. The following form appears:

Figure 3

Press $\boxed{F2}$, with label \boxed{TYPE} above it, to add a function using the equation writer.

The WIN Form

The WIN form allows for the plot window specifications to be entered and changed. The lower and upper horizontal and vertical values displayed on the graph can be changed. The lower and upper value for the independent variable can also be specified on this form. To open the WIN form, press and hold down \leftarrow and press $F2$, which is WIN. The following form appears:

```

PLOT WINDOW - FAST3D
X-Left:-1.    X-Right:1.
Y-Near:-1.    Y-Far: 1.
Z-Low: -1.    Z-High: 1.

Step Indep:10. Depnd:8.
Enter indep var sample count
EDIT          ERASE DRAW

```

Figure 4

The menu label \leftarrow will discard the results of a previous plot and the menu label \leftarrow will begin the plot.

Examples of Fast3D Plotting

Example 1: Plot $Z1(X,Y) = X^2 + Y^2$, using Fast3D

Solution: \leftarrow 2D/3D \leftarrow ALPHA F \leftarrow ENTER (do not forget to press AND hold the \leftarrow key while pressing the 2D/3D key)

```

PLOT SETUP
Type:Fast3D    d:Rad
EQ:

Indep:'X'    Depnd:'Y'

Choose type of plot
CHOOSE        ERASE DRAW

```

Figure 5

ENTER \leftarrow $Y=$ \leftarrow X Y^x 2 \leftarrow \leftarrow + ALPHA Y Y^x 2 ENTER

```

PLOT - FAST3D
Z1(X,Y)=X^2+Y^2

```

```

EDIT ADD DEL CHOOSE ERASE DRAW

```

Figure 6

ENTER \leftarrow WIN \leftarrow \leftarrow \leftarrow \leftarrow / 5 ENTER / 2 ENTER

```

RAD XYZ BIN R= 'Y'
CHOME}
PLOT WINDOW - FAST3D
X-Left:-1.    X-Right:1.
Y-Near:-1.    Y-Far: 1.
Z-Low: -1.    Z-High: 1.

Step Indep:15. Depnd:12.
Enter minimum X view-volume val
EDIT          ERASE DRAW

```

Figure 7

\leftarrow (this will take a few seconds and computing is shown as indicated below)

Computing

```

EDIT          ERASE DRAW

```

Figure 8

Answer: The Fast3D graph is displayed. The lower left corner indicates the directions of each of the axes.



EXIT

Figure 9

Use the cursor keys \leftarrow \rightarrow \downarrow \uparrow to rotate left, right, up and down. You may think them as X- and Y-axis. Use TOOL and NXT to rotate around Z-axis. Finally + and - control the Zoom. To quit displaying this graph, press EXIT then press CANCEL .

Example 2: Plot $Z2(X,Y) = X^3Y - XY^3$, using Fast3D

Solution: \leftarrow 2D/3D MODE ALPHA F ENTER (do not forget to press AND hold the \leftarrow key while pressing the 2D/3D key)

```

PLOT SETUP
Type: Fast3D      d: Rad
Eq:
Indep: 'X'      Depnd: 'Y'
Choose type of plot
CHOOS      ERASE DRAW

```

Figure 10

ENTER \leftarrow Y= DEL (to delete the old equation) X Y^x 3 X ALPHA Y + + -
 X X ALPHA Y Y^x 3 ENTER

```

PLOT - FAST3D
Z2(X,Y)=X^3.Y-XY^3

```

```

EDIT      ADD      DEL      CHOOS      ERASE DRAW

```

Figure 11

ERASE DRAW (this will take a few seconds and computing is shown as indicated below)

Computing



```

EDIT      ADD      DEL      CHOOS      ERASE DRAW

```

Figure 12

Answer: The Fast3D graph is displayed. The lower left corner indicates the directions of each of the axes.



EXIT

Figure 13

Use the cursor keys \leftarrow \rightarrow \downarrow \uparrow to rotate left, right, up and down. You may think them as X- and Y-axis. Use TOOL and NXT to rotate around Z-axis. Finally + and - control the Zoom. To quit displaying this graph, press EXIT then press CANCEL .

Example 3: Plot $Z2(X,Y) = \sin(X+Y)$, using Fast3D

Solution: \leftarrow 2D/3D \leftarrow \leftarrow ALPHA \leftarrow F \leftarrow ENTER (do not forget to press AND hold the \leftarrow key while pressing the 2D/3D key)
 ENTER \leftarrow \leftarrow Y= \leftarrow \leftarrow (to delete the old plot from the plotting list) \leftarrow SIN \leftarrow X \leftarrow + \leftarrow ALPHA \leftarrow Y

$$Z3(X,Y)=\sin(X+Y)$$

EDIT CURS BIG \leftarrow EVAL FACTO SIMP

Figure 14

ENTER \leftarrow ERASE DRAW (this will take a few seconds and computing is shown as indicated below)

Computing



EDIT \leftarrow \leftarrow \leftarrow ERASE DRAW

Figure 15

Answer: The Fast3D graph is displayed. The lower left corner indicates the directions of each of the axes.

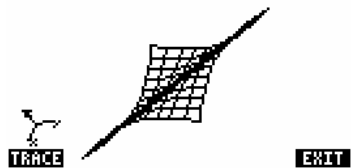


Figure 16

Use the cursor keys \leftarrow \rightarrow \uparrow \downarrow to rotate left, right, up and down. You may think them as X- and Y-axis. Use \leftarrow TOOL and \leftarrow NXT to rotate around Z-axis. Finally \leftarrow + and \leftarrow - control the Zoom. To quit displaying this graph, press \leftarrow \leftarrow then press \leftarrow \leftarrow .