



hp calculators

HP 48GII Working with Fast 3D Plots

Plotting on the HP 48GII

The 2D/3D (PLOT SETUP) Form

The Y= Form

The WIN Form

Examples of Fast3D Plotting



Plotting on the HP 48GII

The HP 48GII calculator provides a host of plots to allow the user to visualize data or relationships between them. The BLUE shifted functions of the top row of keys on the HP 48GII 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 F4 key by pressing and **holding down** F4 and then pressing F4 , to access 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 F2 , which has the label PLOT 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 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** F4 and then press F1 , which is Y= . The following form appears:



Figure 3

Press F2 , with label PLOT 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** F4 and press F2 , which is WIN . The following form appears:

```

PLOT WINDOW - FUNCTION
H-View:-6.5000      6.5000
V-View:-3.1000     3.2000
Indep Low: Default High:Default
Step: Default     _ Pixels

Enter minimum horizontal value
EDIT  AUTO ERASE DRAW
    
```

Figure 4

The menu label **EDIT** will discard the results of a previous plot and the menu label **ERASE DRAW** will begin the plot.

Examples of Fast3D Plotting

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

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

```

PLOT SETUP
Type:Fast3D      a:Rad
EQ:

Indep:'X'  Depnd:'Y'

Choose type of plot
CHOOS  ERASE DRAW
    
```

Figure 5

(ENTER) \leftarrow Y= **EDIT** X y^x 2 Δ Δ + (ALPHA) Y y^x 2 (ENTER)

```

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

EDIT  ADD  DEL  CHOOS  ERASE DRAW
    
```

Figure 6

(ENTER) \leftarrow WIN ∇ ∇ ∇ / 5 (ENTER) / 2 (ENTER)

```

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

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

Computing

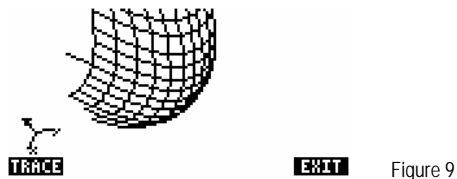


```

EDIT  ERASE DRAW
    
```

Figure 8

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



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 QUIT then press QUIT .

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

Solution: \leftarrow 2D/3D QUIT (ALPHA) F1 ENTER (do not forget to press AND hold the \leftarrow key while pressing the 2D/3D key)



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

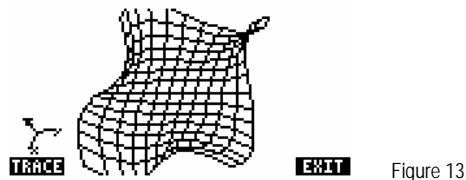


QUIT QUIT (this will take a few seconds and computing is shown as indicated below)

Computing



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



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 QUIT then press QUIT .

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Example 3: Plot $Z2(X,Y) = \text{SIN}(X+Y)$, using Fast3D

Solution: $\left[\leftarrow \right]$ $\left[\frac{2D}{3D} \right]$ $\left[\text{OFF} \right]$ $\left[\text{ALPHA} \right]$ $\left[F \right]$ $\left[\text{ENTER} \right]$ (do not forget to press AND hold the $\left[\leftarrow \right]$ key while pressing the $\left[\frac{2D}{3D} \right]$ key)
 $\left[\text{ENTER} \right]$ $\left[\leftarrow \right]$ $\left[Y= \right]$ $\left[\text{OFF} \right]$ (to delete the old plot from the plotting list) $\left[\text{OFF} \right]$ $\left[\text{SIN} \right]$ $\left[X \right]$ $\left[+ \right]$ $\left[\text{ALPHA} \right]$ $\left[Y \right]$

$$Z3(X,Y)=\text{SIN}(X+Y)$$

EDIT CURS BIG EVAL FACTO SIMP

Figure 14

$\left[\text{ENTER} \right]$ $\left[\text{OFF} \right]$ $\left[\text{OFF} \right]$ (this will take a few seconds and computing is shown as indicated below)

Computing



EDIT **ERASE** **DRAW**

Figure 15

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



EXIT

Figure 16

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