

## Chapter II-13 — Graphs

**Note:** All of the waves you use for the various grouping, adding, and stacking modes should have the same numbers of points, X scaling, and should all be displayed using the same axes.

### Trace Color

You can choose a color for the selected trace from the color pop-up palette of colors.

In addition to color, you can specify opacity using the color pop-up via the “alpha” property. An alpha of 1.0 makes the trace fully opaque. An alpha of 0.0 makes it fully transparent.

### Setting Trace Properties from an Auxiliary (Z) Wave

You can set the color, marker number, marker size, and pattern number of a trace on a point-by-point basis based on the values of an auxiliary wave. The auxiliary wave is called the “Z wave” because other waves control the X and Y position of each point on the trace while the Z wave controls a third property.

For example, you could position markers at the location of earthquakes and vary their size to show the magnitude of each quake. You could show the depth of the quake using marker color and show different types of quakes as different marker shapes.

To set a trace property to be a function of a Z wave, click the “Set as f(z)” button in the Modify Trace Appearance dialog to display the “Set as f(z)” subdialog.

### Color as f(z)

Color as f(z) has four modes: Color Table, Color Table Wave, Color Index Wave, and Three or Four Column Color Wave. You select the mode from the Color Mode menu.

In Color Table mode, the color of each data point on the trace is determined by mapping the corresponding Z wave value into a built-in color table. The mapping is logarithmic if the Log Colors checkbox is checked and linear otherwise. The Log Colors option is useful when the zWave spans many decades and you want to show more detailed changes of the smaller values.

The zMin and zMax settings define the range of values in your Z wave to map onto the color table. Values outside the range take on the color at the end of the range. If you choose Auto for zMin or zMax, Igor uses the smallest or largest value it finds in your Z wave. If any of your Z values are NaN, Igor treats those data points in the same way it does if your X or Y data is NaN. This depends on the Gaps setting in the main dialog.

Color Table Wave mode is the same as Color Table mode except that the colors are determined by a color table wave that you provide instead of a built-in color table. See **Color Table Waves** on page II-399 for details.

In Color Index Wave mode, the color of data points on the trace is derived from the Z wave you choose by mapping its values into the X scaling of the selected 3-column color index wave. This is similar to the way **ModifyImage cindex** maps image values (in place of the Z wave values) to a color in a 3-column color index matrix. See **Indexed Color Details** on page II-400.

In Three or Four Column Color Wave mode, data points are colored according to Red, Green and Blue values in the first three columns of the selected wave. Each row of the three column wave controls the color of a data point on the trace. This mode gives absolute control over the colors of each data point on a trace. If the wave has a fourth column, it controls opacity. See **Direct Color Details** on page II-401 for further information.

### Color as f(z) Example

Create a graph:

```
Make/N=5 yWave = {1,2,3,2,1}
Display yWave
ModifyGraph mode=3, marker=19, mszie=5
```