## The Coefficient Wave

When you fit to a user-defined function, your initial guesses are transmitted to the curve fitting operation via a coefficient wave. The coefficients that result from the fit are output in a coefficient wave no matter what kind of function you select. For the most part, the Curve Fitting dialog hides this from you.

When you create a user-defined function, the dialog creates a function that takes a wave as the input containing the fit coefficients. But through special comments in the function code, the dialog gives names to each of the coefficients. A built-in function has names for the coefficients stored internally. Using these names, the dialog is able to hide from you some of the complexities of using a coefficient wave.

In the history printout following a curve fit, the coefficient values are reported both in the form of a wave assignment, using the actual coefficients wave, and as a list using the coefficient names. For instance, here is the printout from the example user-defined fit earlier (**Fitting to a User-Defined Function** on page III-190):

```
•FuncFit LogFit W_coef logData /D
  Fit converged properly
  fit_logData= LogFit(W_coef,x)
  W_coef={1.0041,0.99922}          ——————— Fit Coefficient values as a wave assignment.
  V_chisq= 0.00282525; V_npnts= 30; V_numNaNs= 0; V_numINFs= 0;
  W_sigma={0.00491,0.00679}        ——————— Fit Coefficient sigmas as a wave assignment.
  Coefficient values ± one standard deviation
   C1 =  1.0041± 0.491      | Fit Coefficient values and sigmas in a list using the coefficient names.
   C2 =  0.99922± 0.679     |
```

The wave assignment version can be copied to the command line and executed, or it can be used as a command in a user procedure. The list version is easier to read.

You control how to handle the coefficients wave using the Coefficient Wave menu on the Coefficients tab. Here are the options.

### Default

When _default_ is chosen it creates a wave called W_coef. For built-in fits this wave is used only for output. For user-defined fits it is also input. The dialog generates commands to put your initial guesses into the wave before the fit starts.

### Explicit Wave

The Coefficient Wave menu lists any wave whose length matches the number of fit coefficients. If you select one of these waves, it is used for input and output from any fit.

When you choose a wave from the menu the data in the wave is used to fill in the Initial Guess column in the Coefficients list. This can be used as a convenient way to enter initial guesses. If you choose an explicit wave and then edit the initial guesses, the dialog generates commands to change the values in the selected coefficient wave before the fit starts. To avoid altering the contents of the wave, after selecting a wave with the initial guesses you want, you can choose _default_ or _New Wave_. The initial guesses will be put into the new or default coefficients wave.

### New Wave

A variation on the explicit coefficients wave is _New Wave_. This works just like an explicit wave except that the dialog generates commands to make the wave before the fit starts, so you don't have to remember to make it before entering the dialog. The wave is filled in with the values from the Initial Guess column.

The _New Wave_ option is convenient if you are doing a number of fits and you want to save the fit coefficients from each fit. If you use _default_ the results of a fit will overwrite the results from any previous fit.

### Errors

Estimates of fitting errors (the estimated standard deviation of the fit coefficients) are automatically stored in a wave named W_sigma. There is no user choice for this output.