Modifications to Difmap for VSOP Data Analysis

Jim Lovell

November 6, 1998

This document describes changes made to Difmap for VSOP data analysis. The most important changes are to the `modelfit` feature to allow various weighting schemes to be applied. Other new features include the ability to plot visibility weights as a function of baseline in `radplot` and `projplot`. It is also possible to plot the vector difference between measured and model visibilities in `radplot`, `projplot` and `vplot`. These changes are described below with instructions on how to use them.

The modified version of Difmap may be started by typing `vsop_difmap` at the prompt.

Modelfit

The following Difmap commands now pass on their parameters to `modelfit`:

1. **selfant.** The selfant command allows the user to adjust antenna weights during self calibration. These weights are now also passed through to `modelfit`.

2. **selftaper.** This command allows for a Gaussian taper to be applied to the visibilities to increase the weight on longer baselines during self-calibration. When such a taper is set, `modelfit` will also use it. See the help for this command to find out how to use it.

3. **uvweight.** It is possible to implement radial weighting through this command in Difmap. This normally applies a weighting to visibilities that decreases linearly with *(u,v)* radius. However, if radial weighting is switched on before model fitting, a weighting function will be applied that *increases* linearly with *(u,v)* radius. Therefore it is important to bear these differences in mind when switching between using `modelfit` and `clean`.

4. **uvrange.** This command may be used to include only a specified range of *(u,v)* spacings when model fitting.

Plotting weights

The Difmap tasks **radplot** and **projplot** have been given an option so that the raw visibility weights (i.e. $1/\sigma^2$) are plotted as a function of baseline. To plot the weights, either specify "e" in the `rflags` string or, when the cursor is active in the `radplot` or `projplot` window, press the "E" key, followed by the "L" key to re-draw. Pressing the "E" key, followed by the "L" key again will return the plot to its normal form.

Note: At the moment `radplot` *and* `projplot` *use the maximum visibility amplitude to scale the plot. This means that the weights will probably be outside the default range and will not be plotted. To avoid this, start* `radplot` *or* `projplot` *with a large default amplitude range (e.g* `radplot ,0,0,0,1000000`*) and then zoom in (using the "Z" key) to the required range. This bug will be fixed in the near future.*

Also Note: When flagging data based on their weights, do not click the mouse near the point to remove it as this may result in the wrong point being flagged. Instead, use the "C" command. This bug will be fixed in the near future.

Measured and Model Visibility Differences

The vector difference between measured and model visibilities may now be plotted in `radplot`, `projplot` and `vplot`. To do this, either specify "−" in the `rflags` or `vflags` string as appropriate or, when the cursor is active in the plot window, press the "−" key, followed by the "L" key to re-draw. Pressing the "−" key followed by the "L" key again will return the plot to its normal form.

Also Note: When flagging data based on the difference between measured and model visibilities, do not click the mouse near the point to remove it as this may result in the wrong point being flagged. Instead, use the "C" command. This bug will be fixed in the near future.