

Legplot Tutorial

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This is what the legplot window looks like when you first open it (Figure1):

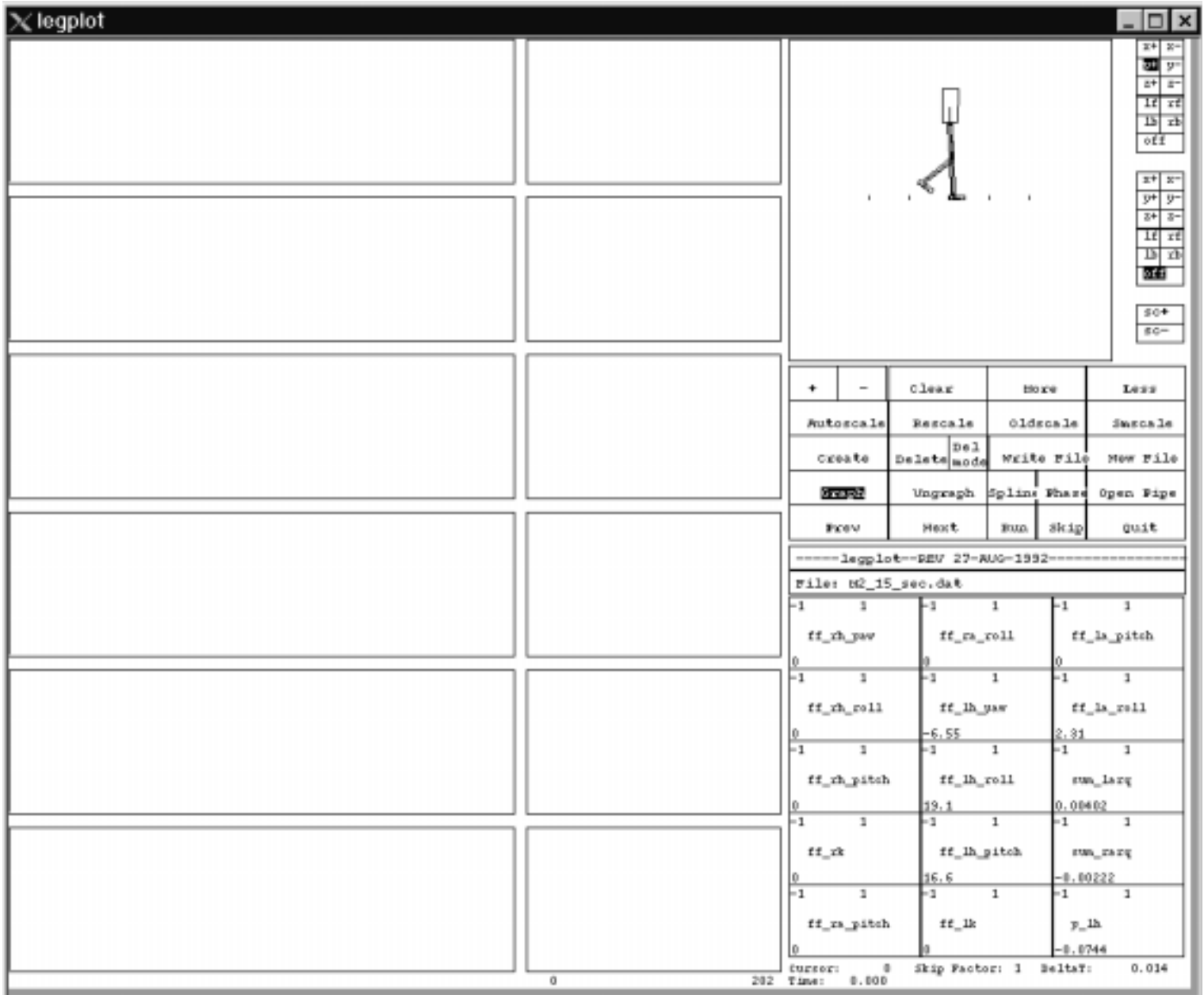


Figure 1

In Figure 1, you see a picture of a biped called “M2” that was created and simulated in creature library. From now on, we call the figure shown below “cartoon box” (Figure 2).

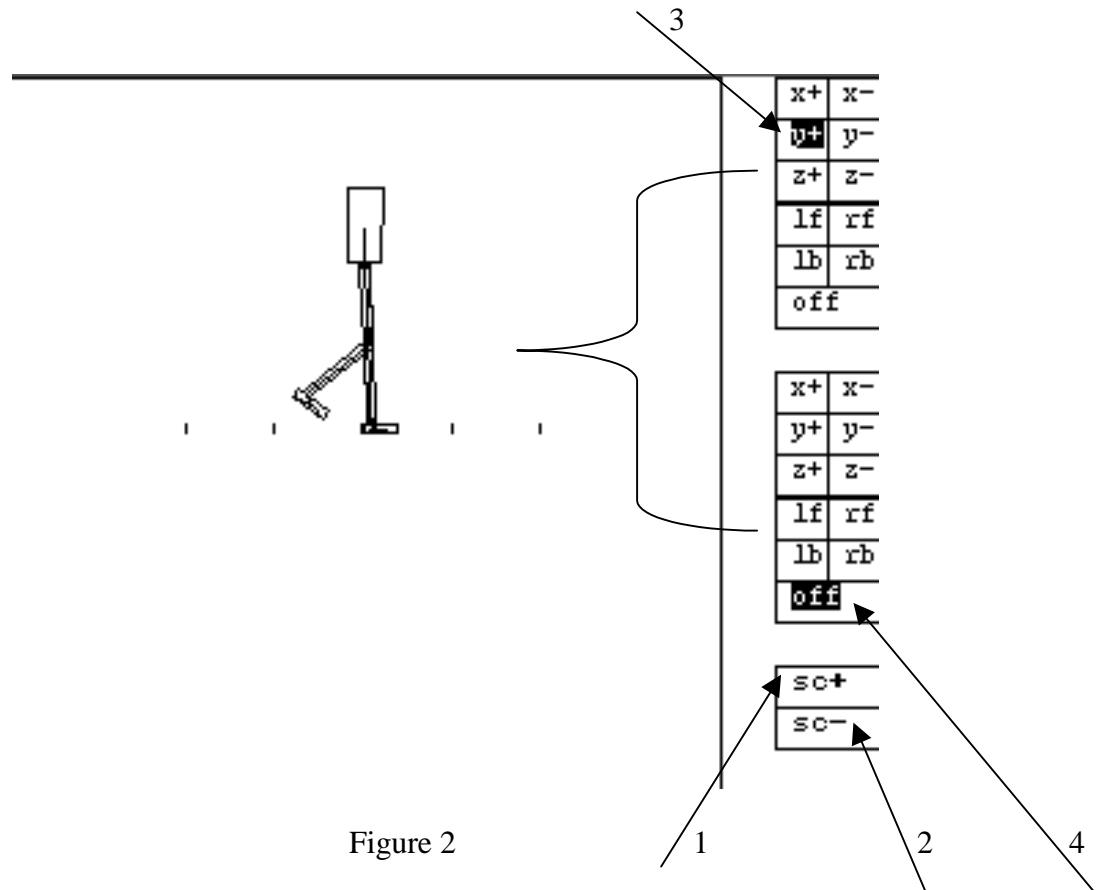


Figure 2

You can make your creature look bigger or smaller by clicking on “sc+” (arrow 1 in Figure 2) and “sc-“ (arrow 2 in Figure 2), respectively. As you can see in Figure 2, the element “y+” (arrow 3 in Figure 2) has been highlighted which means that you are looking at the creature towards the positive-y direction which is going inside the page, in other words, the creature is facing the positive-x direction (towards right). If you click on say “x+”, then you are looking at the creature towards the positive-x direction. “lf” and “rf” are simply left front and right front views, respectively, and “lb” and “rb” are left back and right back views, respectively. Click on them and see how the angle of view changes. Notice that there are two control panels (as shown with the brace in Figure 2) to work with. You can have two pictures of the same creature in the “cartoon box” facing different directions while the legplot is running, or you can shut one off by clicking on the “off” (arrow 4 in Figure 2) button. If you decide to make your creature look bigger and you realize that it is going off the “cartoon box” screen quickly, try to turn off the panel that has activated the creature, and turn the other one on by clicking on one of the buttons in the panel. Figure 3 shows what the creature looks like if you look at it towards the “x+” direction, and zoom it in.

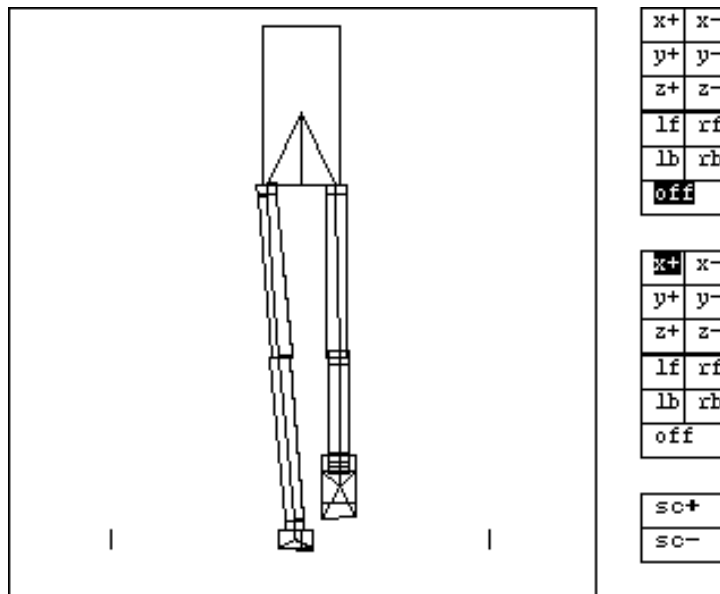


Figure 3

We will call what appears in Figure 4 “control panel”, what appears in Figure 5 “variables box”, and what appears in Figure 6 “plot window”.

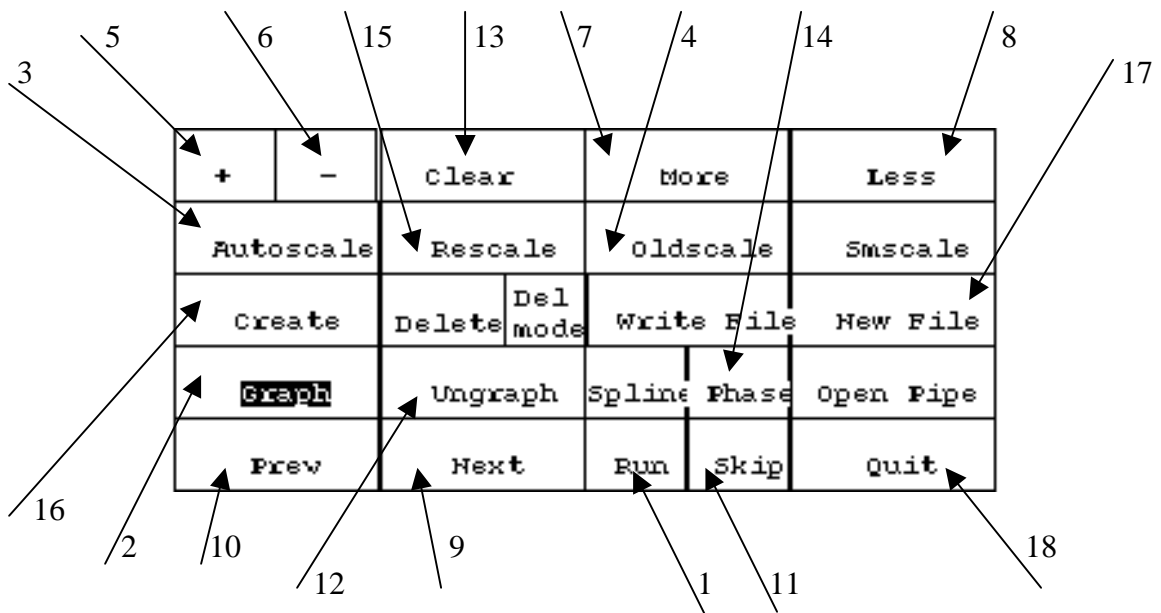


Figure 4

File: m2_15_sec.dat		
-1 1 ff_rh_yaw 0	-1 1 ff_ra_roll 0	-1 1 ff_la_pitch 0
-1 1 ff_rh_roll 0	-1 1 ff_lh_yaw -6.55	-1 1 ff_la_roll 2.31
-1 1 ff_rh_pitch 0	-1 1 ff_lh_roll 19.1	-1 1 sum_larq 0.00402
-1 1 ff_rk 0	-1 1 ff_lh_pitch 16.6	-1 1 sum_rarq -0.00222
-1 1 ff_ra_pitch 0	-1 1 ff_lk 0	-1 1 y_lh -0.0744

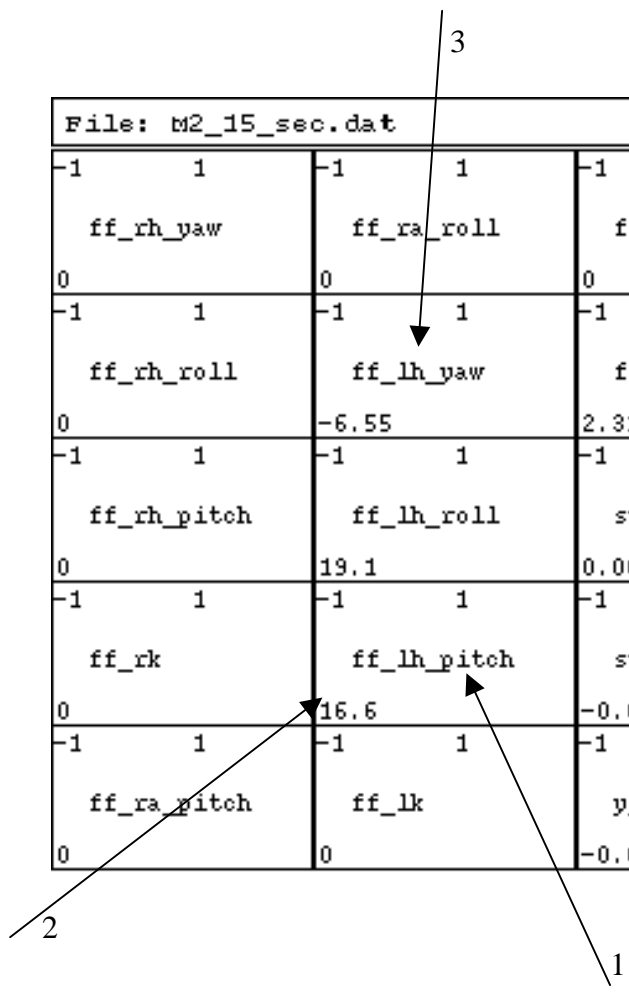


Figure 5

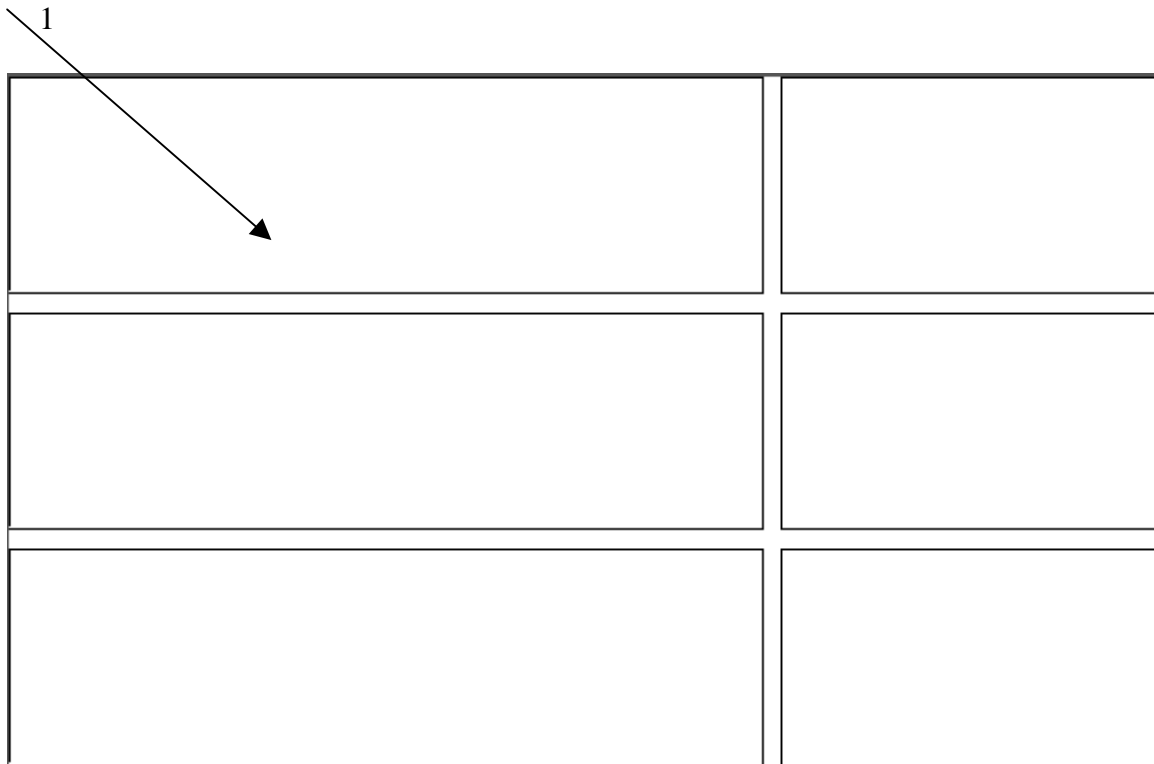


Figure 6

Clicking on “run” (arrow 1 in Figure 4) will run the legplot meaning that the creature will be displaying the graphical results of the simulation data file that was opened by legplot. Clicking on “run” again will stop the process. In order to plot a variable during the time that the simulation had run, first make sure that “graph” (arrow 2 in Figure 4) is selected and your creature is NOT running (For the legplot features to take effect, you must make sure that your creature is NOT running), if it is not selected, select it by clicking on “graph”. Now select a variable in the “variables box” (Figure 5) that you wish to plot e.g. “ff_lh_pitch” (arrow 1 in Figure 5) then click on one of the boxes in the “plot window” (arrow 1 in Figure 6). You might notice that your plot is hard to read, therefore every time you plot something, make sure that you auto scale it by clicking on “Autoscale” (arrow 3 in Figure 4) then clicking on the variable name in the “variables box”. What “Autoscale” does is it fits the plot in the space provided with the right scaling. The result of above operations is shown in Figure 7. Clicking on the “Oldscale” (arrow 4 in Figure 4) will put the plot back to its original format.

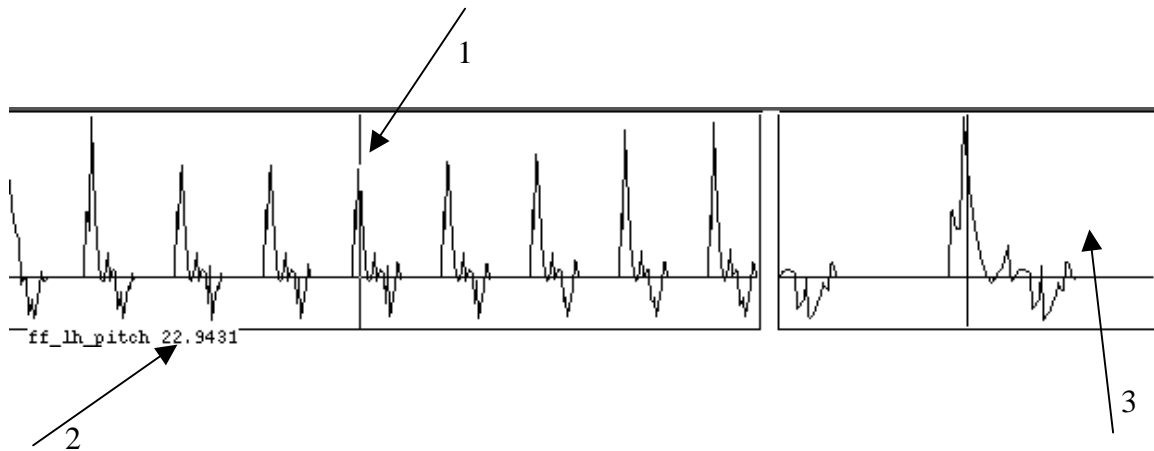


Figure 7

As you might have already noticed, the value of each variable at any instant can be obtained by clicking on the graph (arrow 1 in Figure 7) at that instant which is displayed in the lower left corner of the plot (arrow 2 in Figure 7). To read the value of a variable at any recorded frame, use the “+” (arrow 5 in Figure 4) or “-“ (arrow 6 in Figure 4) keys which will advance or retreat the values of a variable at any frame. You can also read the value of each variable at any recorded frame at the bottom of each variable name (arrow 2 in Figure 5) in the “variables box”. Notice that there is a smaller plot window to the right of the larger one (arrow 3 in Figure 7), which is the zoomed in version of vicinity of where the time bar is (arrow 1 in Figure 7). If you click on “more” (arrow 7 in Figure 4) or “less” (arrow 8 in Figure 4), you can squeeze or stretch the plot in the smaller box, respectively. The “less” option is particularly useful when you have run your simulation for a long time and all the plots are squeezed. To plot variables that you are not displayed in the “variables box”, keep clicking on “Next” (arrow 9 in Figure 4) until your desired variable shows up. Clicking on “Prev” will scan the variables backwards (arrow 10 in Figure 4). Remember again that only the variables are accessible to plot that had been recorded in your state file that you ran your simulation with. If legplot is running your creature too fast or too slow, you can click on “Skip” (arrow 11 in Figure 4), which will open up a blue box (Figure 8) in which you can enter a number (It might take awhile until the box pops up, so be patient!). A positive number greater than 1 will increase the speed of the creature’s action and a negative number or a positive number less than 1 will decrease the speed of the creature’s action.



Figure 8

If you decide to erase a plot that already exists in one of the either boxes in the “plot window”, just click on “Ungraph” (arrow 12 in Figure 4), and then select the variable name that you want to erase the plot of in the “variables box” or click on the plot itself. The “Clear” Button” (arrow 13 in Figure 4) will erase all the plots at once. Legplot allows you to plot one variable vs another by using the “Phase” (arrow 14 in Figure 4) button. For example, suppose you want to plot “ff_lh_pitch” (arrow 1 in Figure 5) vs ff_lh_yaw (arrow 3 in Figure 5). First plot “ff_lh_pitch” and “ff_lh_yaw” in two different plot boxes as shown in Figure 9 then click on “Phase”, which will highlight both plots as shown in Figure 10. Now you need to determine a time interval for this plot. First click on the point you want the plot to begin then click on the point you want the plot to end. This will highlight only the section of the plots in the time interval that you have specified as shown in Figure 11. Finally, to make the plot, first click on the variable name that you want to be in the horizontal axis (in this case “ff_lh_pitch”) and then click on the variable name that you want to be in the vertical axis (in this case “ff_lh_yaw”), which will result in sketching the plot of “ff_lh_pitch” vs “ff_lh_yaw” as shown in Figure 12.

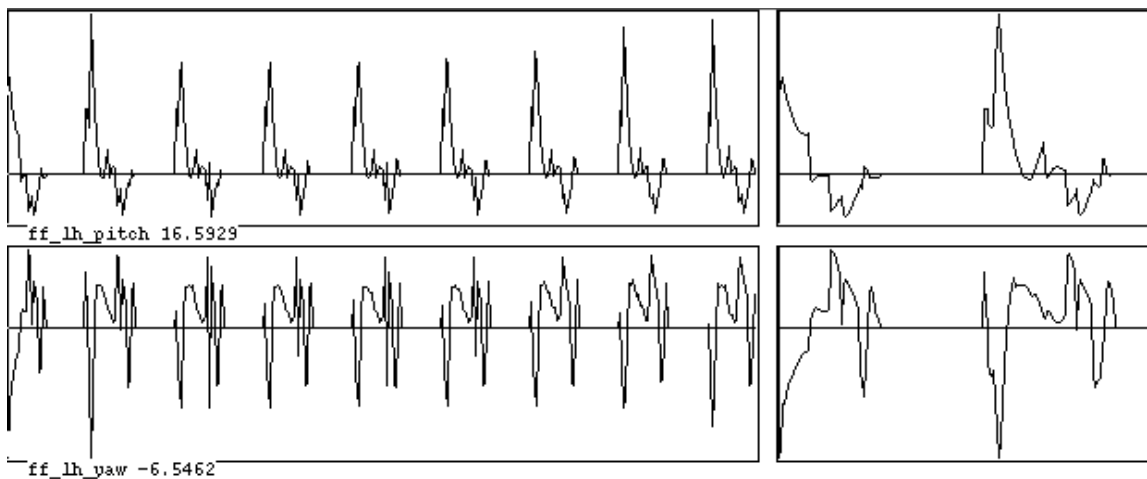


Figure 9

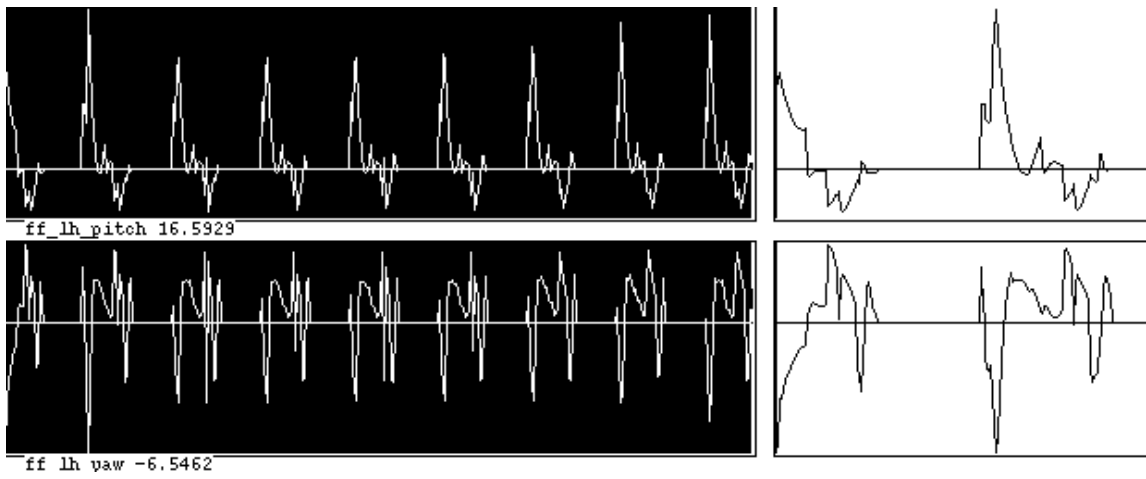


Figure 10

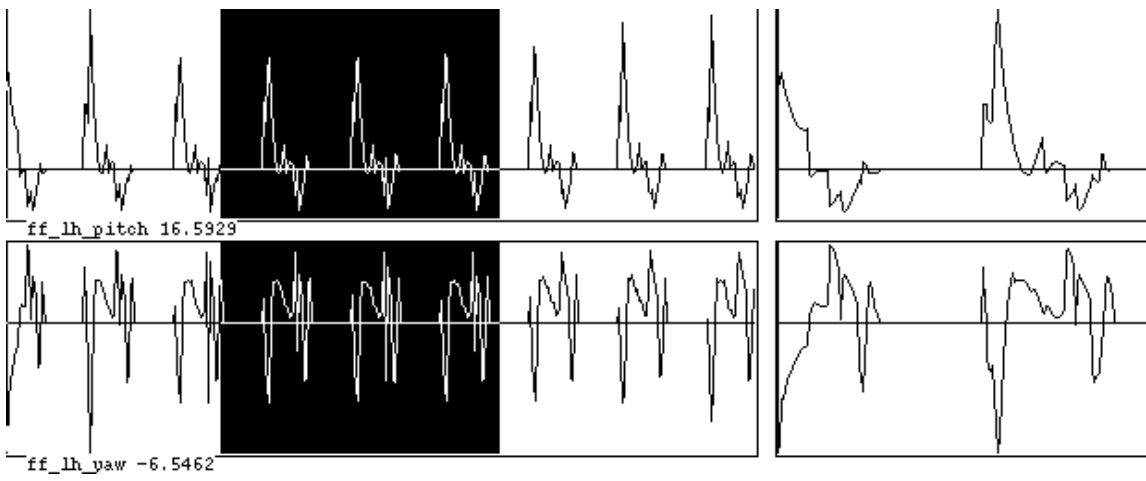


Figure 11

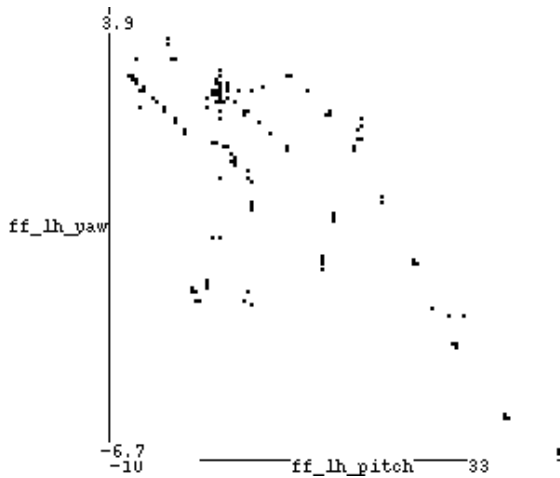


Figure 12

Sometimes, you might observe some unwanted peaks or results that have been blown up on your plots, in this case you can choose a desired interval for your variable (on the vertical axis) by first clicking on “Rescale” (arrow 15 in Figure 4) which will open up a box (Figure 13) which tells you what the smallest value of that particular variable is (It might take awhile until the box pops up, so be patient!). You can enter any lower limit that you wish and press “OK”, which will take you to the next box, which tells you what the largest value of that particular variable is. Again, you can enter any upper limit that you wish and press “OK”. For example, for the plots shown in Figure 7, if your lower bound is chosen to be -5.0 and the upper bound is chosen to be 10.0 , the plot for “ff_lh_pitch” will look like as shown in Figure 14.

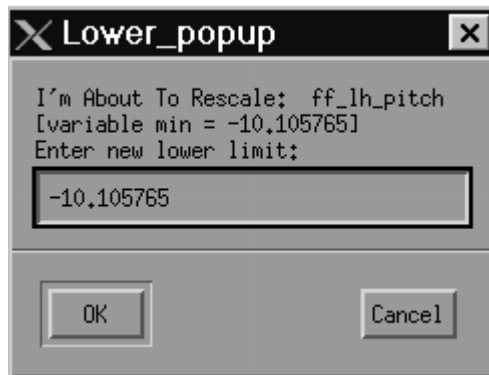


Figure 13

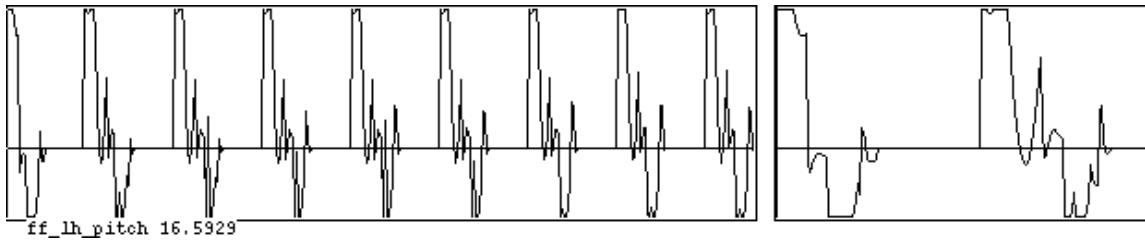


Figure 14

Suppose you would like to define a new function in terms of the existing variables that appear in the “variables box”. Click on “Create” (arrow 16 in Figure 4), it will open up a window (Figure 15). At the prompt, define a new variable in terms of the existing variables e.g. `foo=3.0*ff_lh_pitch+ ff_lh_roll;` make sure to put a semi-colon at the end of your expression. After you are done defining your new variable, hit enter twice to close the “Create” window. Now if you keep clicking on “Next”, you will find your new variable at the very end of the “variables box” (arrow 1 in Figure 16), which you can treat like the rest of the variables (plotting, etc.). Of course, the only time one would want to use this option is when you do not want to go back to your “control.c” file and define a new variable and recompile it.

If you want to open up another data file click on “New File” (arrow 17 in Figure 4), which will open up a new window (Figure 17), then just type the name of the new data file. Clicking on “Quit” (arrow 18 in Figure 4) will exit legplot.

There are some other features that legplot has which are not of great importance.

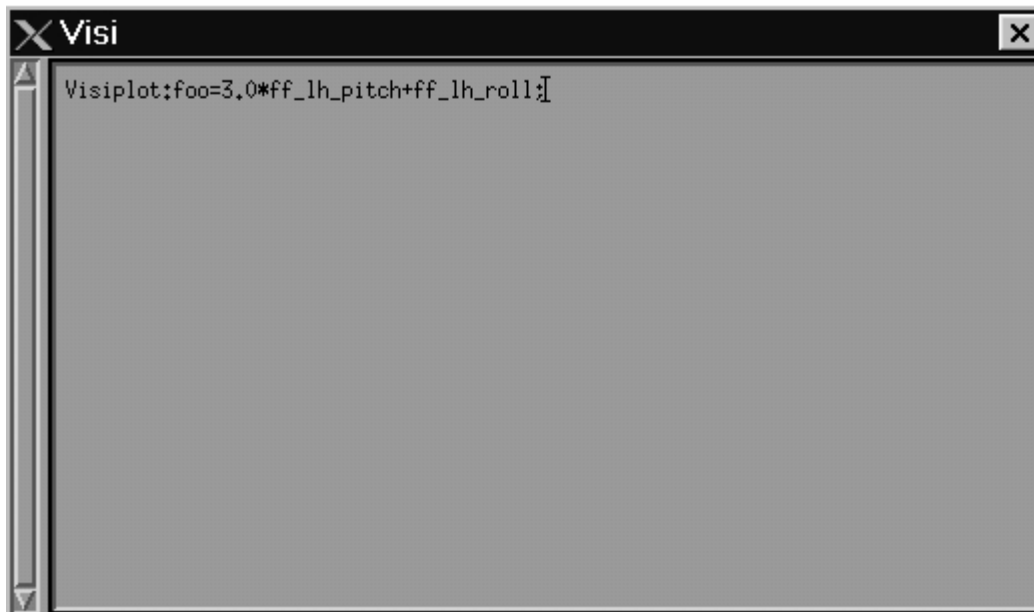


Figure 15

```
--*-legplot--REV 27-AUG-1992-----  
File: M2_15_sec.dat  
-----  
-1      1  
gc_lheel_out.f_y  
-16.3  
-----  
-1      1  
gc_lheel_out.f_z  
57.5  
-----  
-5.7    1.1e+02  
foo  
68.9
```

1

Figure 16



Figure 17

If you have any more questions on how to use the legplot, come see us at NE43-006 or call us at (617)253-2475.