GUI Tutorial

Allen Parseghian
November 15, 1999

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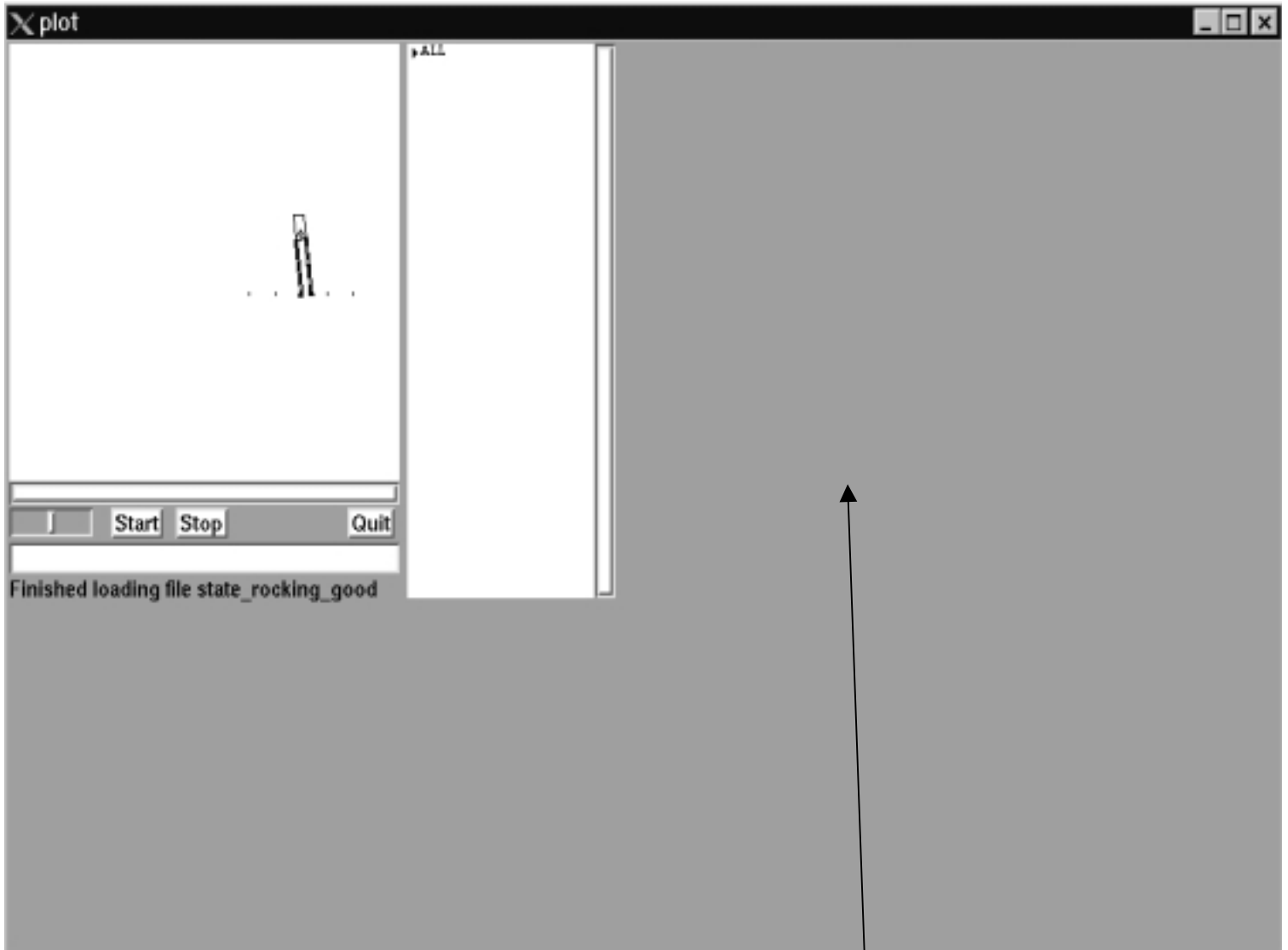

Figure 1

1

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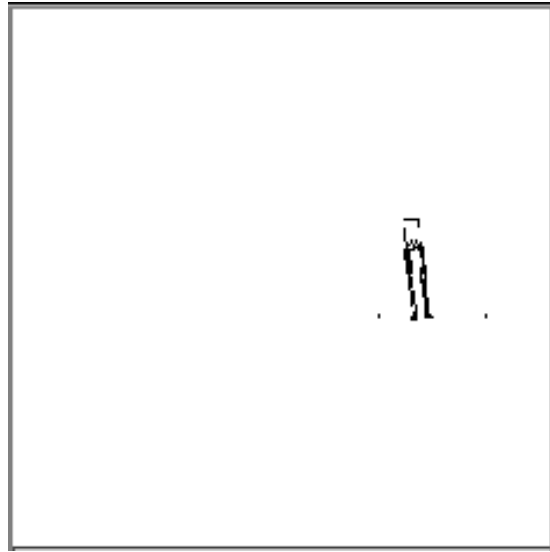From now on, we call the figure shown in the next page "cartoon box" (Figure 2).

Figure 2

As you might have noticed, the creature looks small and somewhat off the center of the "cartoon box". In order to bring the creature to a desired position with desired size, use your right mouse button to move the creature to where in the "cartoon box" you would want it to be (just hold down the right mouse button while you are dragging the mouse around), and use our middle mouse button, (if your mouse does not have a middle button, click on both left and right mouse buttons at the same time which will do the job of a middle mouse button) to zoom in or zoom out the creature (just hold down the middle mouse button while you are dragging the mouse up and down). If you prefer to see a certain angle of view of the creature, use your left mouse button (just hold down the left mouse button while you are dragging the mouse around). Once you are happy with the position, size, and angle of view of your creature, you can save this configuration as a state file so that every time you open up GUI with that particular state file, it opens up the desired position, size, and angle of view of your creature. Before we say how to save a state file, let's call what we see in Figure 3, "script box".
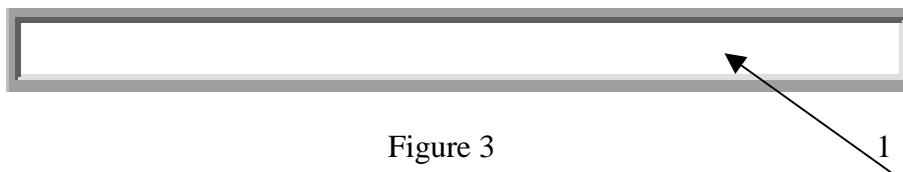

Figure 3   1

In order to be able to type anything in the GUI's "script box", you have to make sure that your mouse curser is located somewhere inside the box (arrow 1 in Figure 3). Therefore, in order to save a new state file, first place your mouse curser somewhere inside the

"script box", then type "ssave *state_file_name*" e.g. "ssave state2". To see how it works, quit GUI by typing "q" in "script box" then reopen it by typing "*creature_name recent_state_file_name* –gui" e.g. "M2 state2 –gui" which should open up both state2 and your desired GUI cartoon configuration. For example, Figure 4 shows a sample result of the above operations on what was originally shown in Figure 2.
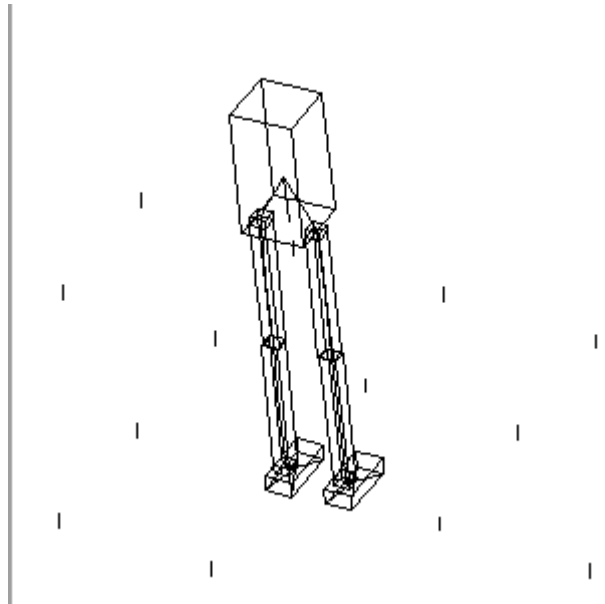

Figure 4

From now on, we call the figure shown in the next page "variables box" (Figure 5).

In order to see all the variables/constants that exist in the particular state file that GUI was opened with, click on the little arrow located right next to "ALL" (arrow 1 in Figure 5). The result will look something like what is shown in Figure 6. You can scroll up and down (arrow 1 in Figure 6) until you find your desired variable. Notice that there is a little arrow right next to each variable, where clicking on each will open up what that particular variable contains. For example, if you find the variable "qd" (all the velocities, arrow 2 in Figure 6) and you click on it, it will open up "qd.*" where * indicates all the names given to the joints in the "create_*creature_name*.c". Figure 7 shows the result of the above operation for M2 (the brace in Figure 7). GUI allows you to play around with the variables setting them to any desired values that you want. For example, you would like to let your robot fall from a certain height in the air, then all you need to do is first click on "q", then click on "q.z" which will result in highlighting "q.z" with a red bar (arrow 4 in Figure 8) in the middle as shown by arrow 1 in Figure 8. Holding down the left mouse button on the red bar while you are dragging the mouse left and right will decrease and increase the value of "q.z", respectively, and at the same time the creature will respond to this position change i.e. its height will increase. Another way to set a variable to a value, in the "script box" type "set *variable_name new_value*". Note that all

the commands stated on page 25 and page 26 of the creature library tutorial under "Simulation Commands", can be used by typing them in the GUI's "script box". If you would like to start GUI with certain initial conditions for your variables every time you open it, after you made changes to the variables, you need to save it as a state file just the same way you did for the creature's position, size, and angle of view by typing "ssave *state_file_name*" in the "script box".

1

▶ALL

icm22
icm23
icm31
icm32
icm33
▶cm_
fmax
tmax
answer
fit1
▶q.
▶nq.
▶qd.
▶nqd.
▶u.
▶nu.
▶ud.
▶nud.
▶q_d.
▶q_err.
▶qd_d.
▶tau.
▶servosw.
▶sn.
▶cs.
▶fk.
▶tk.
▶gc_rtoe_in.
▶gc_rtoe_out.
▶gc_rheel_in.
▶gc_rheel_out.
▶gc_ltoe_in.
▶gc_ltoe_out.
▶gc_lheel_in.
▶gc_lheel_out.

2

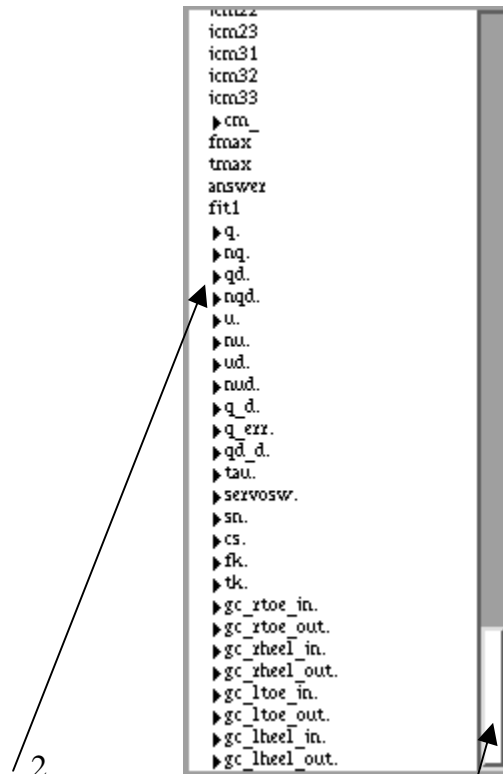Figure 5   Figure 6
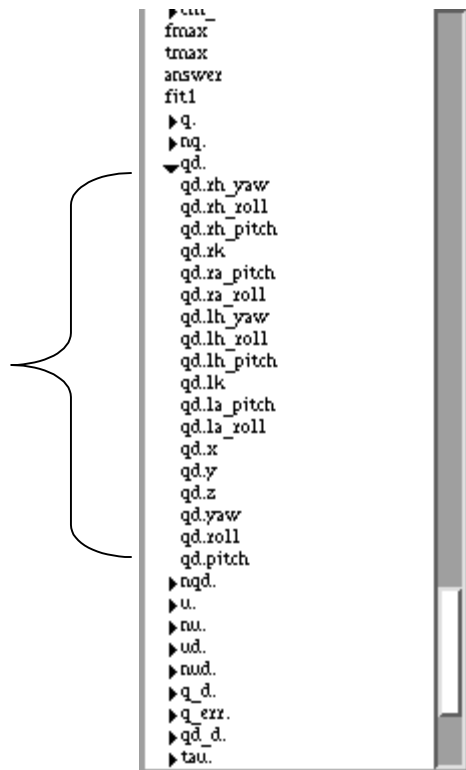
1

Figure 7

Figure 8

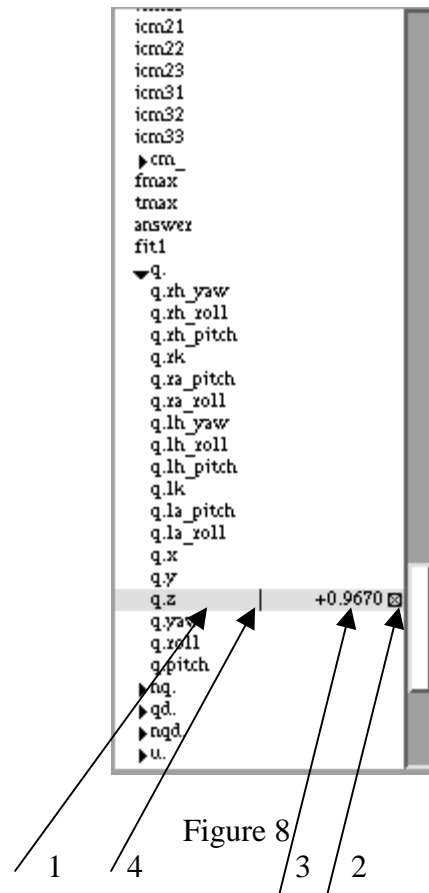1   4   3   2

From now on, we call the gray area in Figure 1 "plot window" (arrow 1 in Figure 1).
GUI allows the user to see the live plot of any variable while the simulation in running.
But, the plot box must be opened up before running the simulation. Suppose you would
like to see the plot of "q.z" while the simulation is running. There are two ways to do
this 1) Place your mouse cursor inside the "script box" and type "graph q.z" which will
open up a little plot box for the variable "q.z" or 2) Click on "q.z", you will notice that
after it is highlighted, there is a little tiny box (arrow 2 in Figure 8) that shows up right
next to the current value of "q.z" (arrow 3 in Figure 8). If that box is not selected, select
it! (you can tell it is selected by checking to see whether there is a red cross inside the
box or not, presence of a red cross means that the box is selected and otherwise means
that the box is not selected), then hold down the left mouse button inside the little box
and drag it somewhere into the "plot window". If you want to plot all the positions i.e.
all the "q." variables in the "script box", type "graph q.*". The result is shown in Figure
9.

To start the simulation, click on "Start" (arrow 1 in Figure 10). Your creature will start
responding to your controller while the plots for your selected variables are being
sketched. Clicking on "Stop" (arrow 2 in Figure 10) will stop the simulation. You might
notice that most plots are fairly flat, therefore you need to auto scale them (just like in
legplot). To auto scale a plot, click on where arrow 1 in Figure 11 is pointing. Holding

down the control key on your keyboard and clicking on the auto scale button will auto
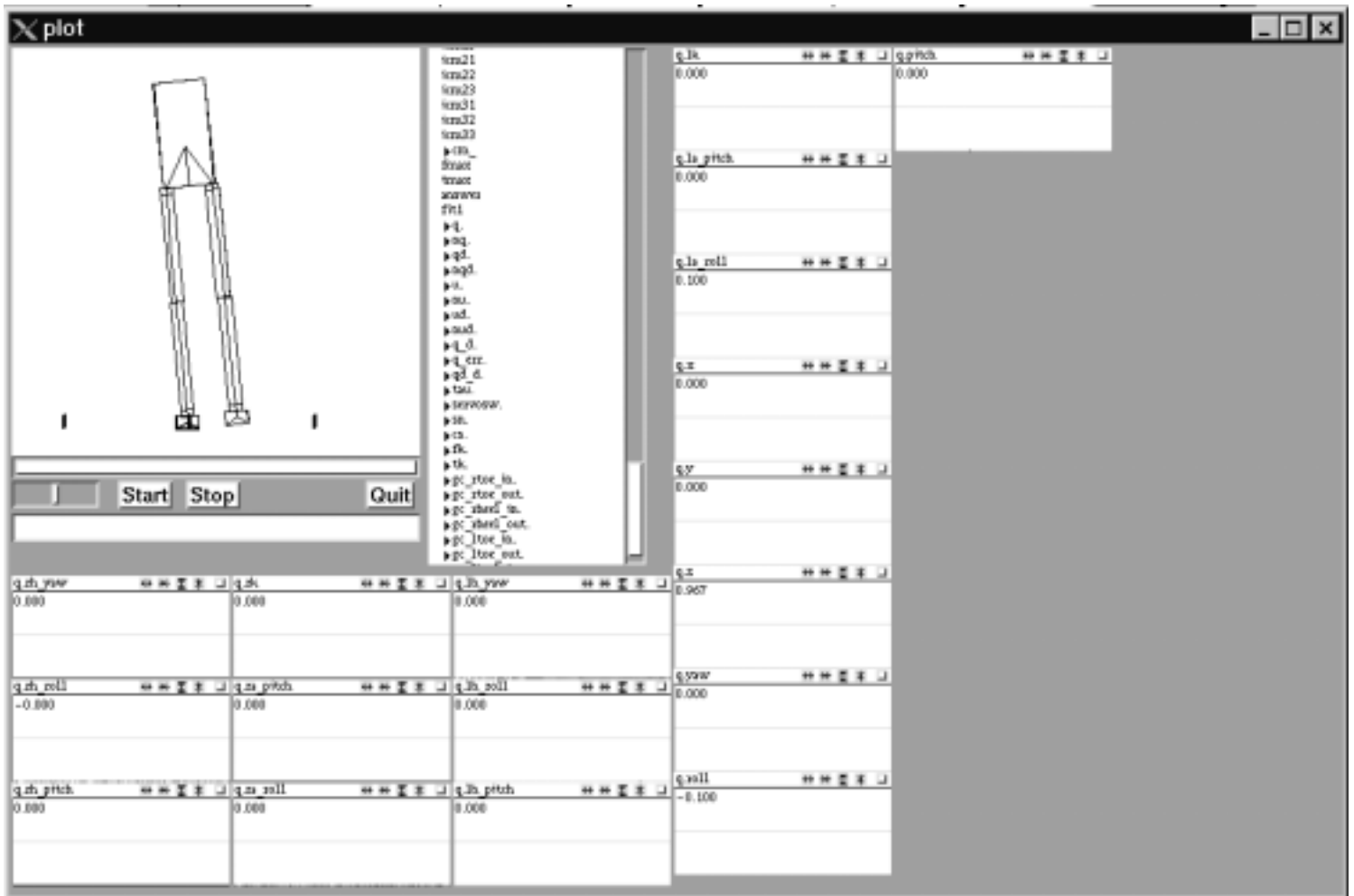scale all the plots at once.

Figure 9

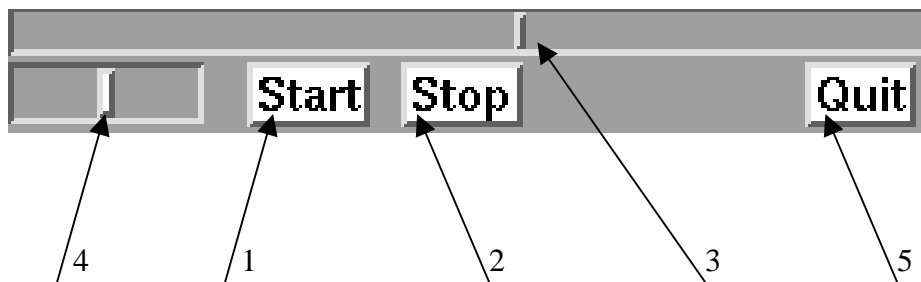From now on, we call what is show in Figure 10 "control panel".
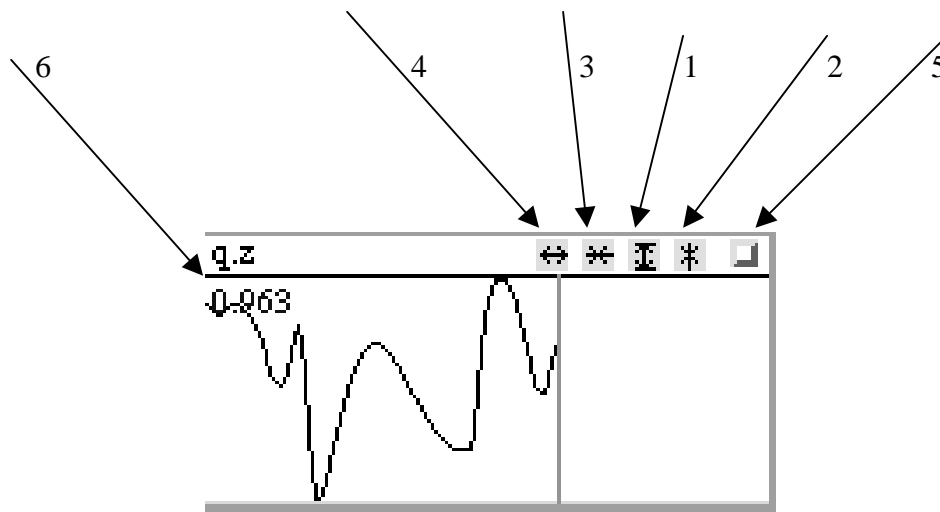

Figure 10

Figure 11

You can squeeze the plots vertically by clicking on where arrow 2 in Figure 11 is pointing. Clicking on where arrow 3 in Figure 11 is pointing will squeeze the plots horizontally, and clicking on where arrow 4 in Figure 11 is pointing will stretch the plots horizontally. To close a plot click on where arrow 5 in Figure 11 is pointing. In the upper left corner of Figure 11, the value of each variable is displayed at any instant (arrow 6 in Figure 11). If the plot is blocking the value of a variable, just squeeze the plot vertically by one degree to be able to read the value of the variable. To obtain the value of each variable that is plotted at any instant, just drag around the "time bar" (arrow 3 in Figure 10) using your left mouse button. To continue playing the simulation click on "Start" again. If you want to replay what you have already played, drag the "replay bar" (arrow 4 in Figure 10) to the right of its midpoint position. The farther right you place the "replay bar", the faster it will replay it for you. To play what has already been played backwards, drag the "replay bar" to the left of its midpoint position. Placing the "replay bar" to its midpoint position will stop the replay action.

Suppose that you want to observe certain plots every time you run your simulation e.g. some torques, some positions, some velocities, and time. You can save this configuration as a file so that you don't have to type "graph *variable_name*" every time you want to observe those desired plots. To do the save, open up all the plot boxes of the variables you would like to see the plots of, place your mouse curser in the "script box", and type "gsave *file_name*" e.g. "gsave graph1". Next time you open up GUI, in the "script box", just type "gload *file_name*" e.g. "gload graph1". To quit GUI, click on "Quit" (arrow 5 in Figure 10).

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