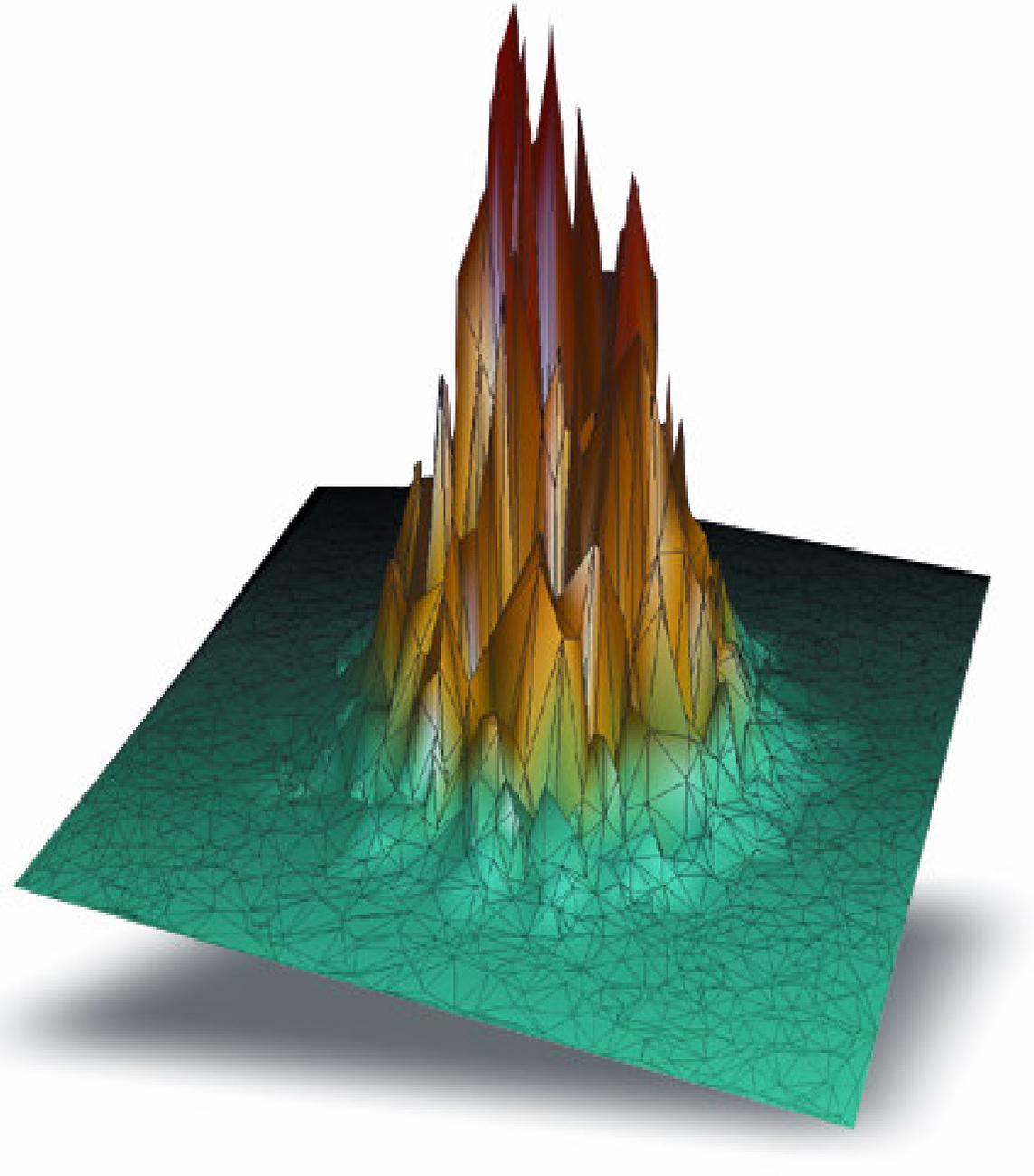


iTools Tutorial Two



Creating Multiple Y-Axis Plots

Creating Multiple Y-Axis Plots

This tutorial assumes the user has a basic understanding of iTools. If you are a beginning iTools user, it is recommended that you first review the tutorial *Using iTools*.

Often users need to display multiple datasets within a plot that have the same dependent variable (X) while the independent variables (Y) have very different data ranges. This tutorial will take you through the steps of plotting 2 variables, an X velocity vector and a Y velocity vector. Although the ranges of the two variables are similar they can still be used to demonstrate the concept of creating multiple Y-axis plots. The data used in this tutorial is a telemetry stream from a sensor that measures the horizontal and vertical velocities on an aircraft in flight over a specified time period. The dependent variable (X) is just the number of elements in the data. They represent time increments of hundredths of seconds.

Begin at the IDL command line by restoring the sample data used in the tutorial:

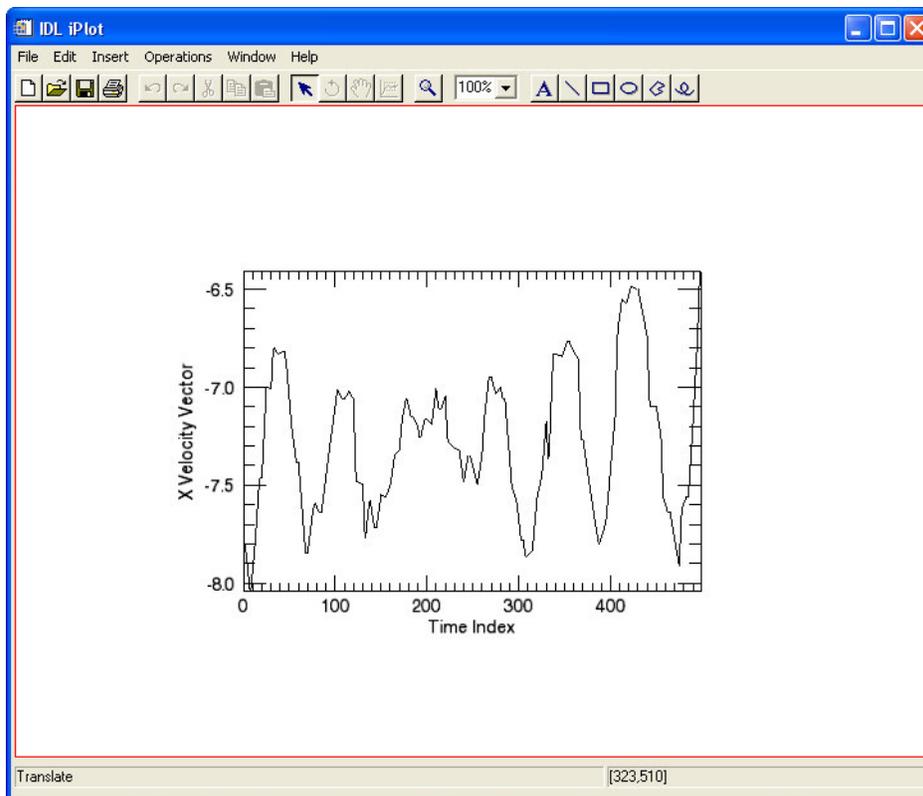
1) RESTORE, 'telemetry.sav'

Depending on where the file is located on your system, you may need to use a fully qualified path in the above command.

Next, type the command "I PLOT", and pass in the variable "X". You can also specify titles for the x and y axes.

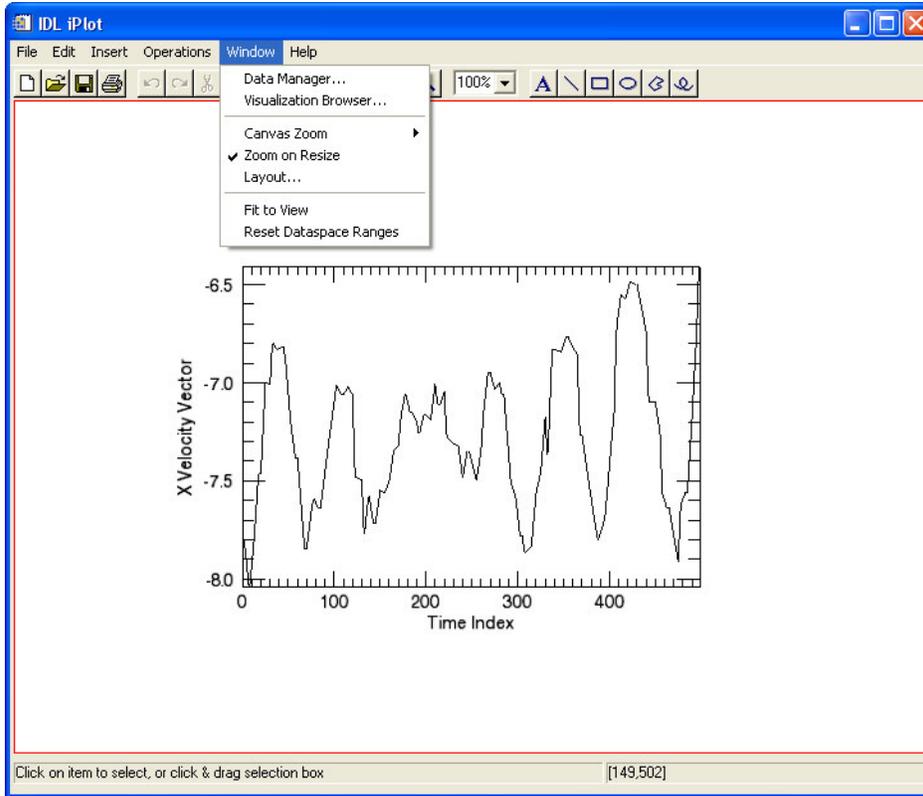
2) I PLOT, X, XTITLE="Time Index", YTITLE="X Velocity Vector"

When you hit return, an iPlot window with the "X" variable plotted will appear.



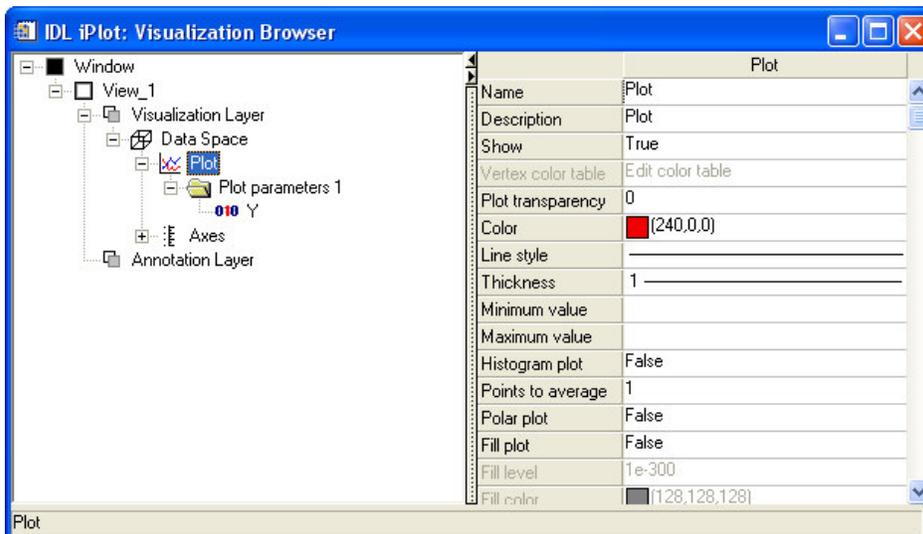
Now adjust the plot properties via the Visualization Browser from the Window menu.

3) Select Window -> Visualization Browser...

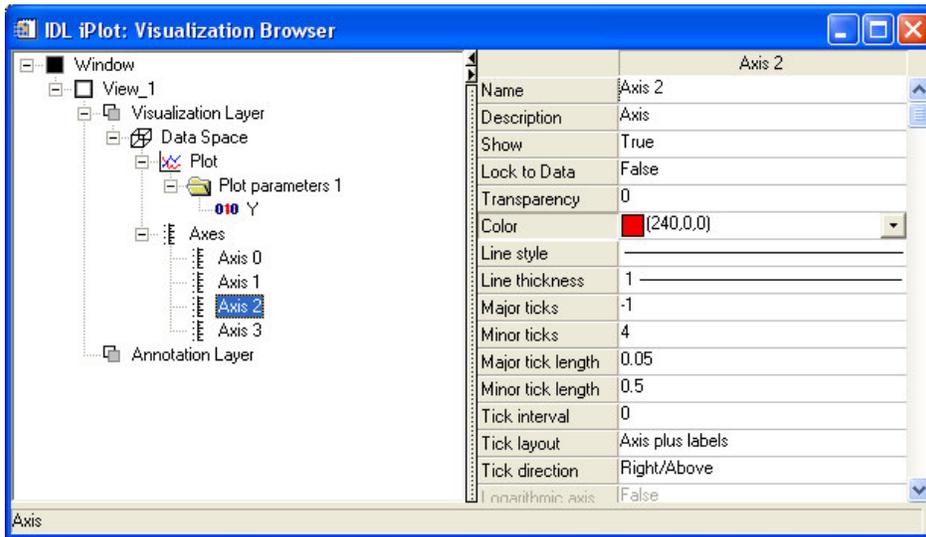


The Visualization Browser displays a hierarchical view of all of the contents of the tool, starting with the Window itself. This window will be used extensively as you continue with the tutorial so it is recommended that it remain open.

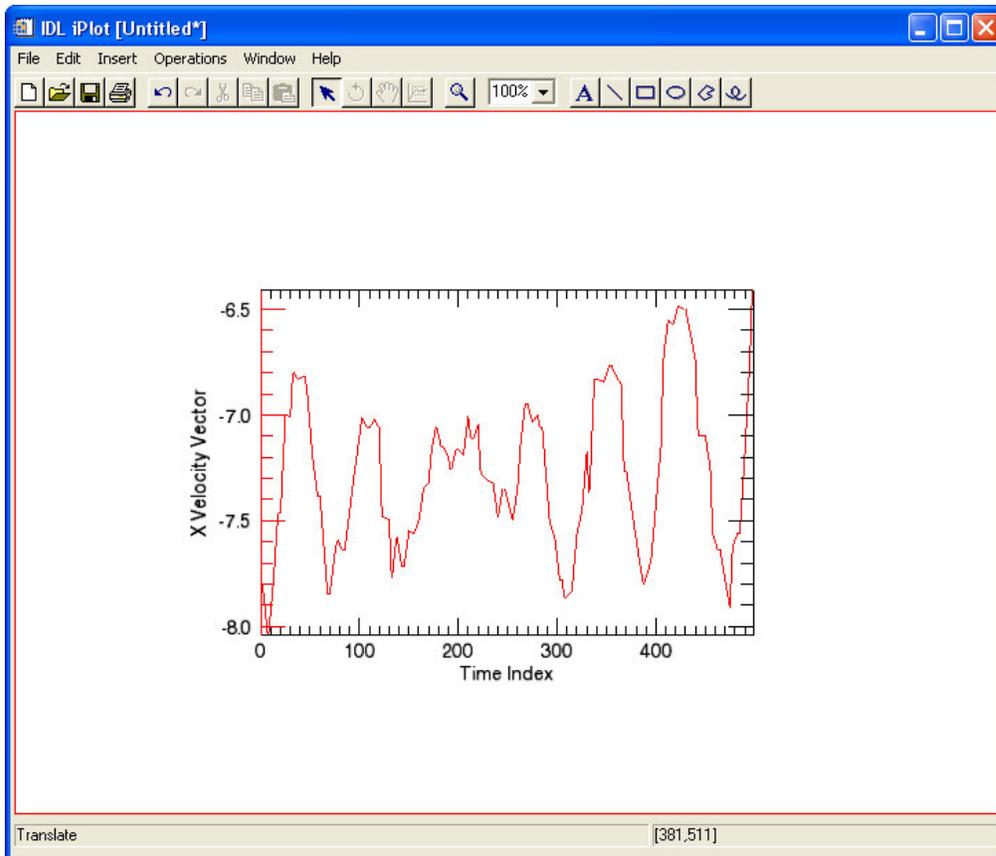
4) Select the Plot and change the color to RED.



5) Now select Axis 2, which is the left side Y-axis. Change the color property to RED to match the plot line.



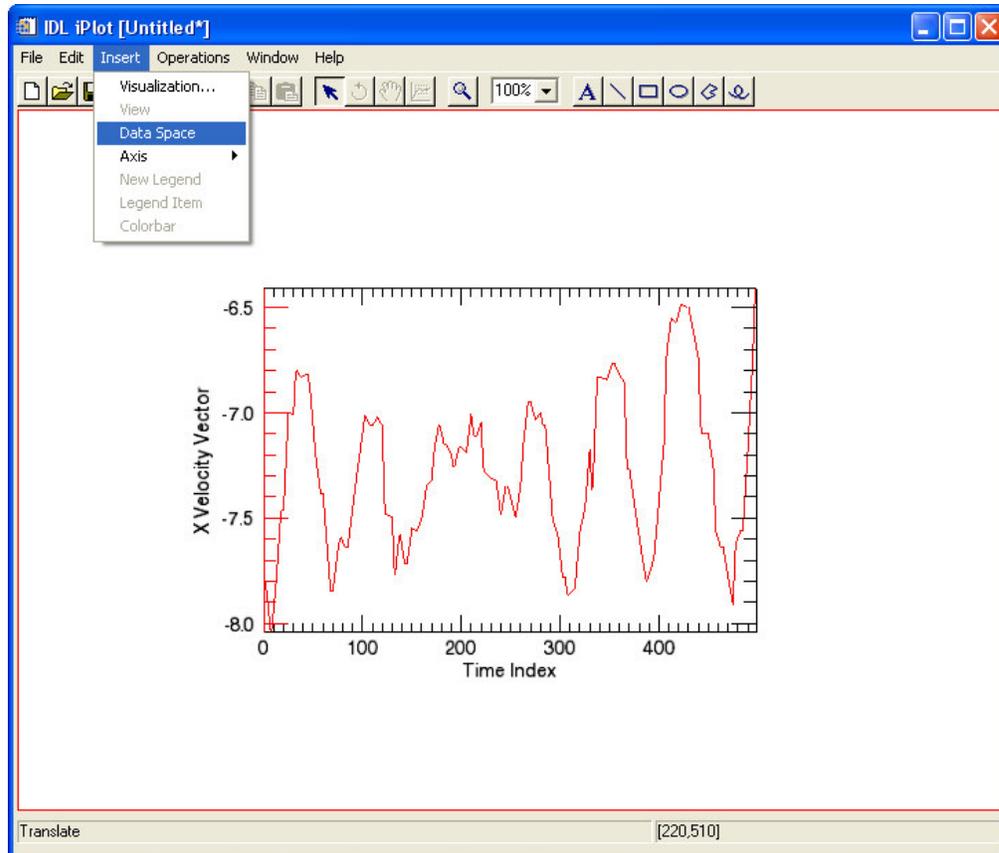
The iPlot window should now look like the following.



A window can contain multiple Views, depending on the layout of the tool. Each View contains two layers: a visualization layer and an on-glass annotation layer. In this case, your annotation layer contains your title and legend. The visualization layer contains the data space (and there can be multiple data spaces in a single view). The data space contains the visualization items (plot lines, in this case), and axes. We will use this feature to plot an additional dataset that has a different data range.

From the main iPlot menu we will create a new data space for our additional data.

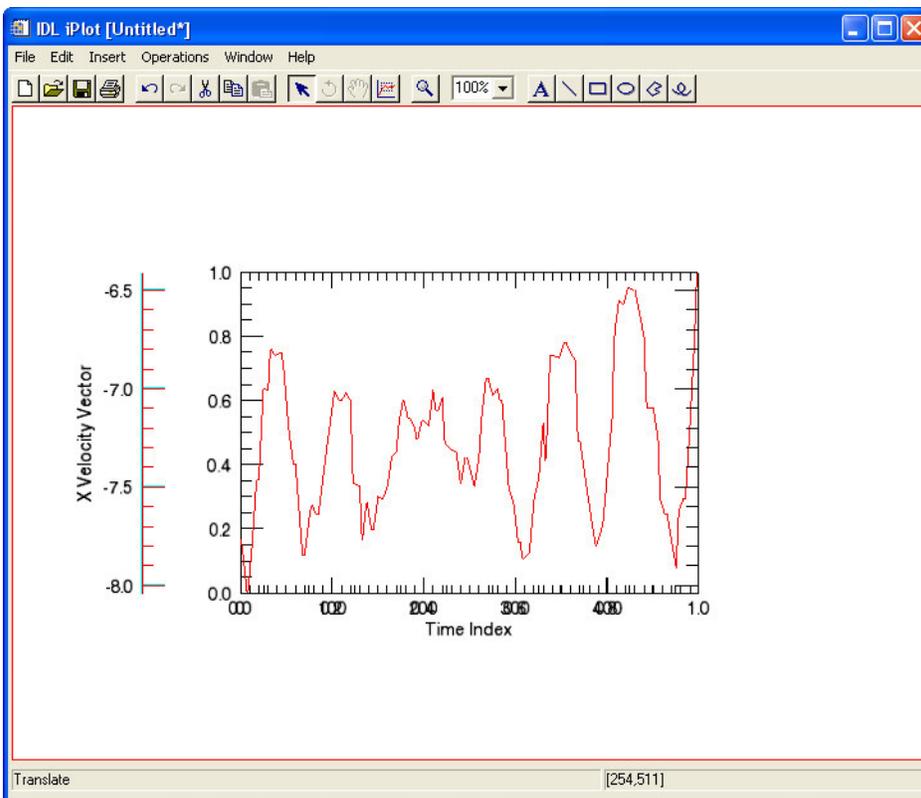
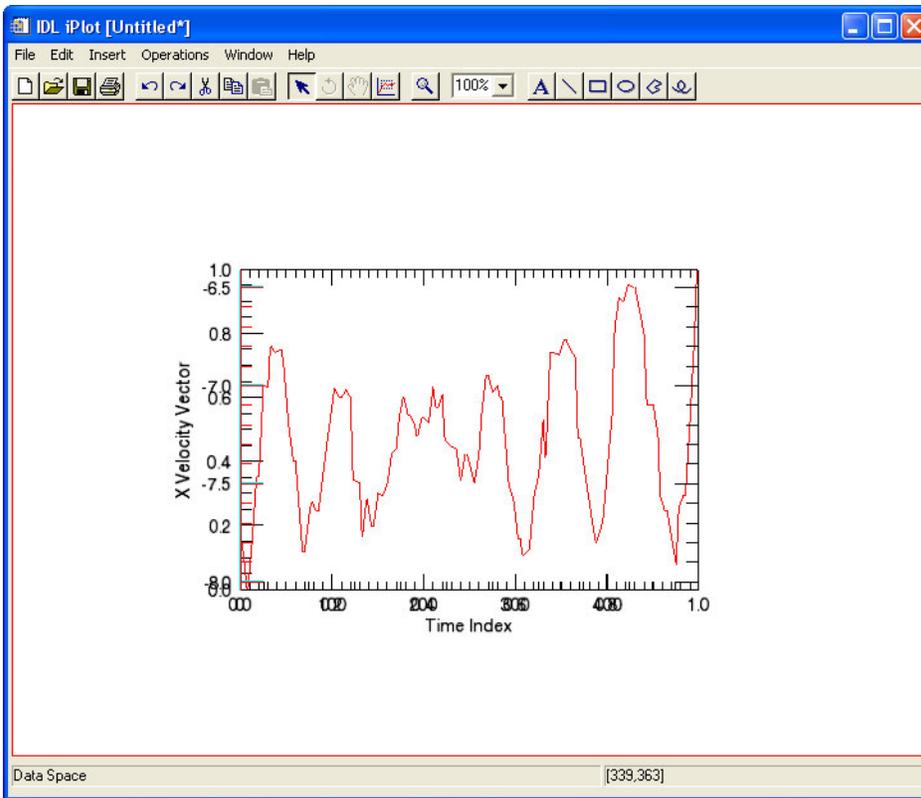
6) Select Insert -> Data Space



A new data space has now been added to the Visualization layer. By default the axis ranges are set to [0.0, 1.0]. In order to differentiate between the two axes for each data space we need to reposition one Y-axis and hide or remove one X-axis since they are redundant.

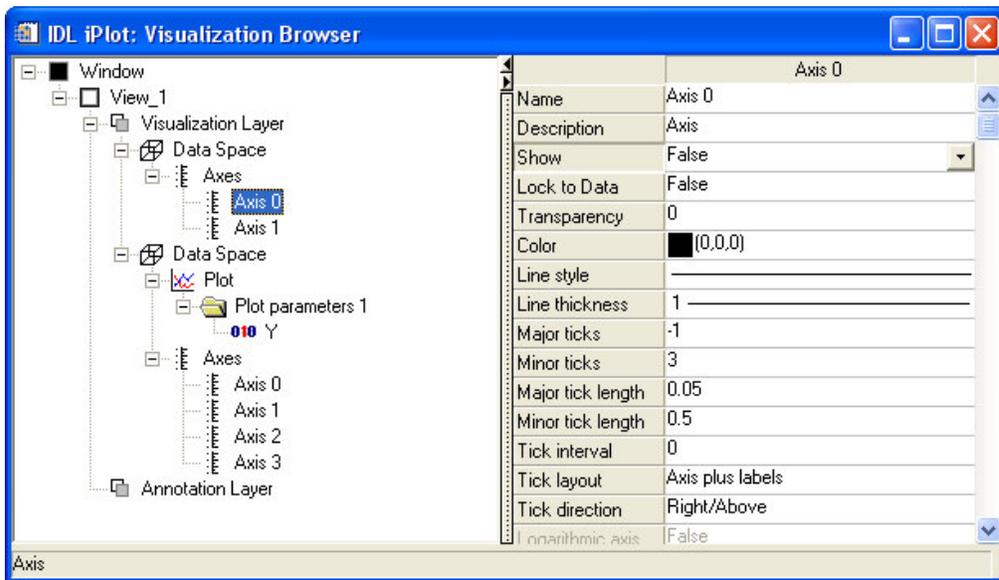
Start by moving the Y-axis.

7) Position the cursor over the Y-axis title "X Velocity Vector". Click, hold and drag the axis/title to the left. Drop at an appropriate location.

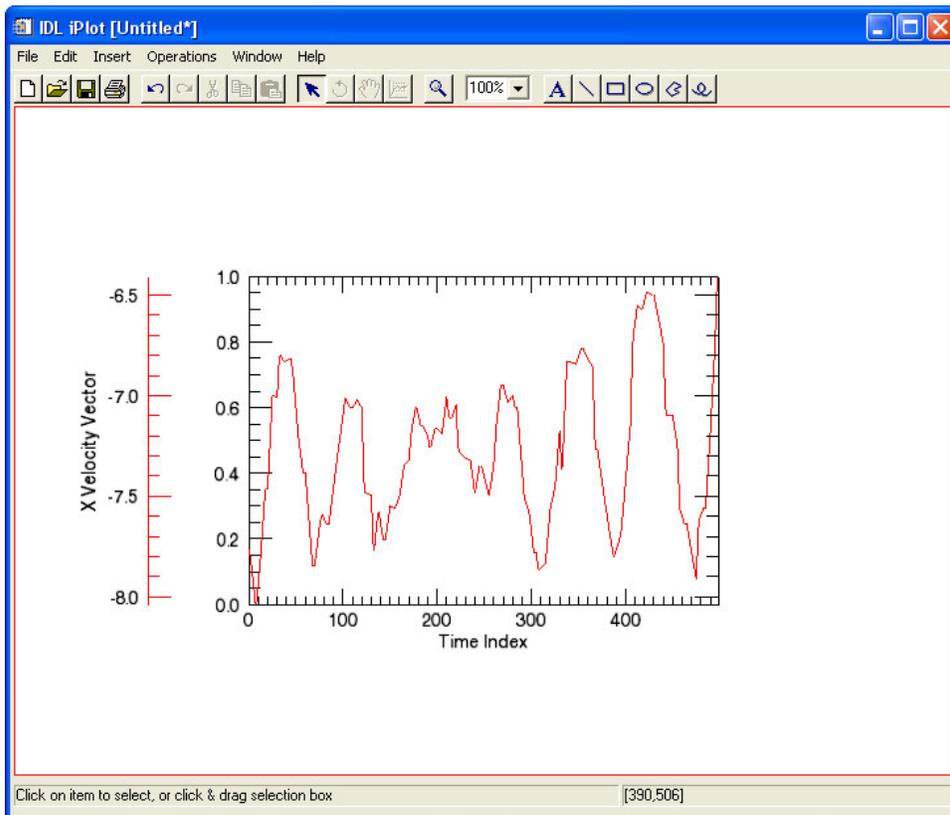


Now we need to hide or remove the second X-axis, which is done in the Visualization Browser.

8) Select Axis 0 of the first listed Data Space. Set the Show property to False. To remove the axis entirely right mouse button click on Axis 0. When the context menu appears select “Delete”

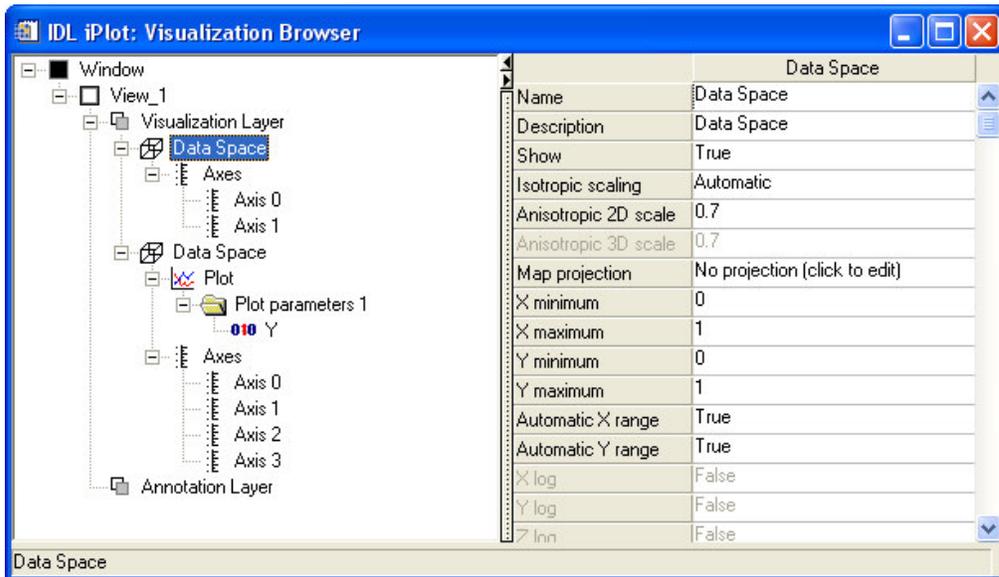


The iPlot window should now look like the following:



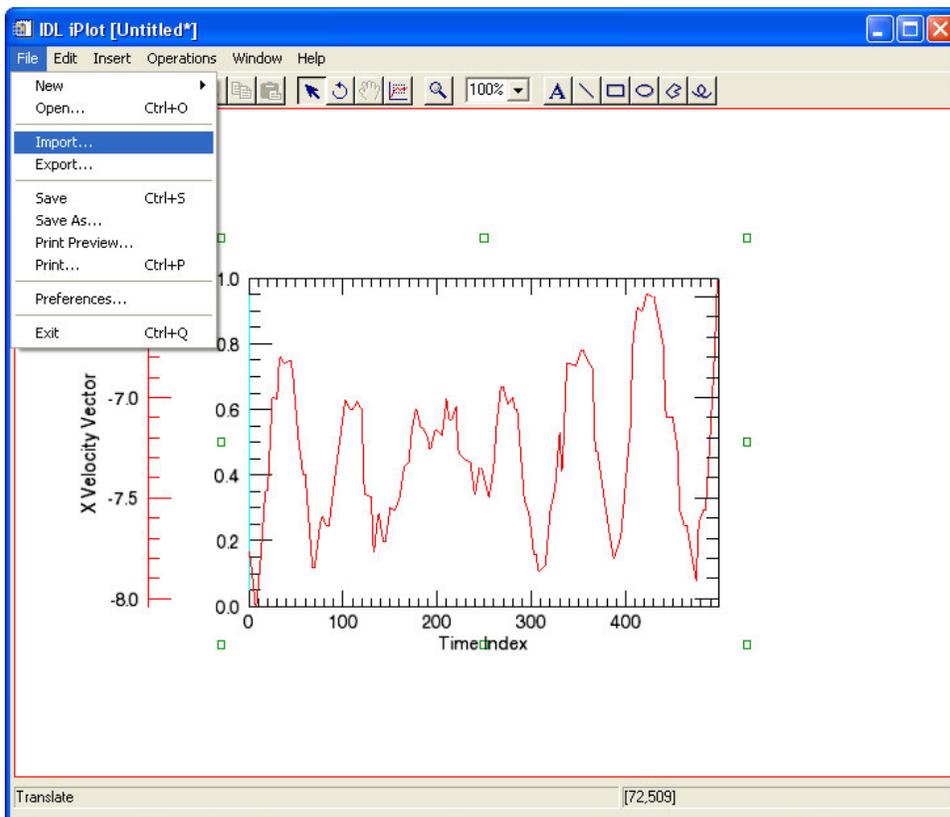
We now will proceed with adding the new dataset to this iPlot window.

9) Start by selecting the newly added data space. This is the first one listed within the visualization layer.



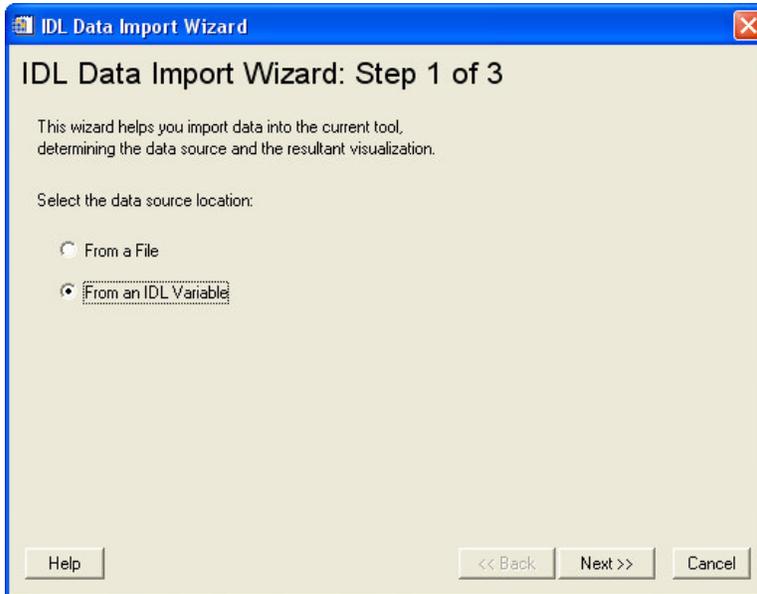
Once selected, go back to the main iPlot window in order to import the new data.

10) Select File -> Import



The data variables have previously been restored from the .sav file so we can import from an IDL variable.

11) Select the data source location “From an IDL Variable”

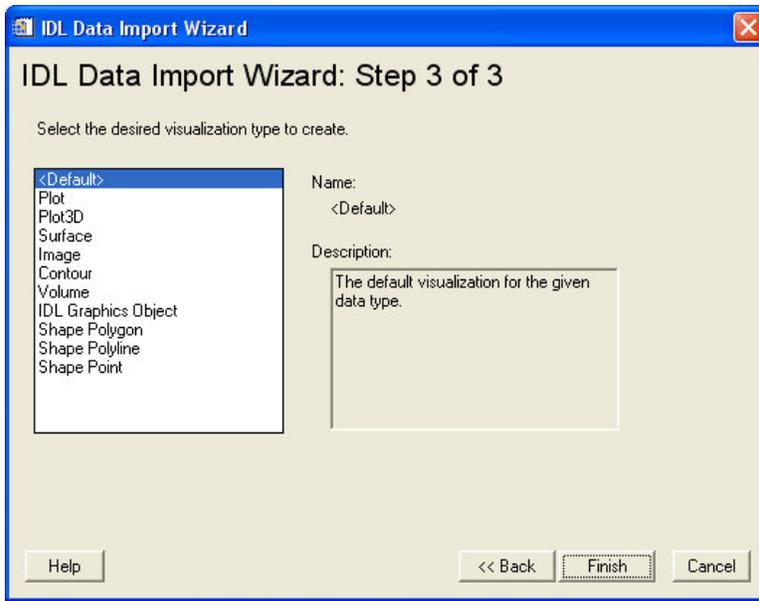


12) Select Y from the list of IDL Variables then hit Next.

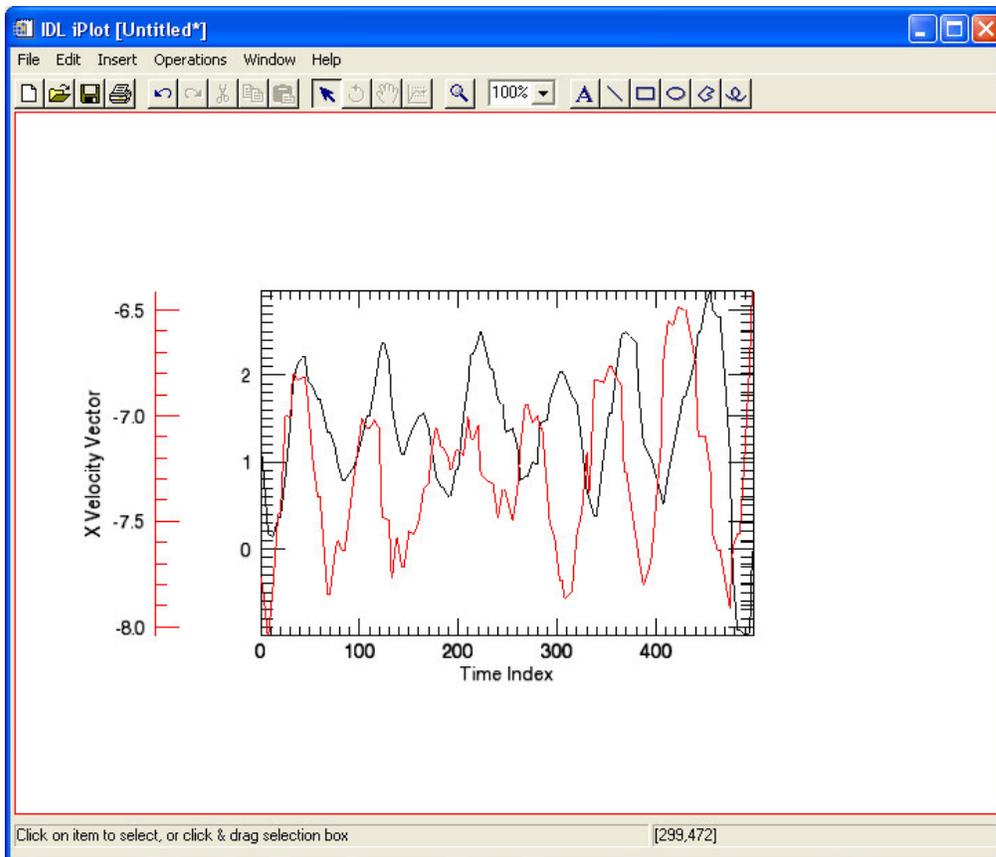


Since the default visualization in this case is a plot there is no need to select one but the “Plot” type may be selected if you like.

13) Select Finish.

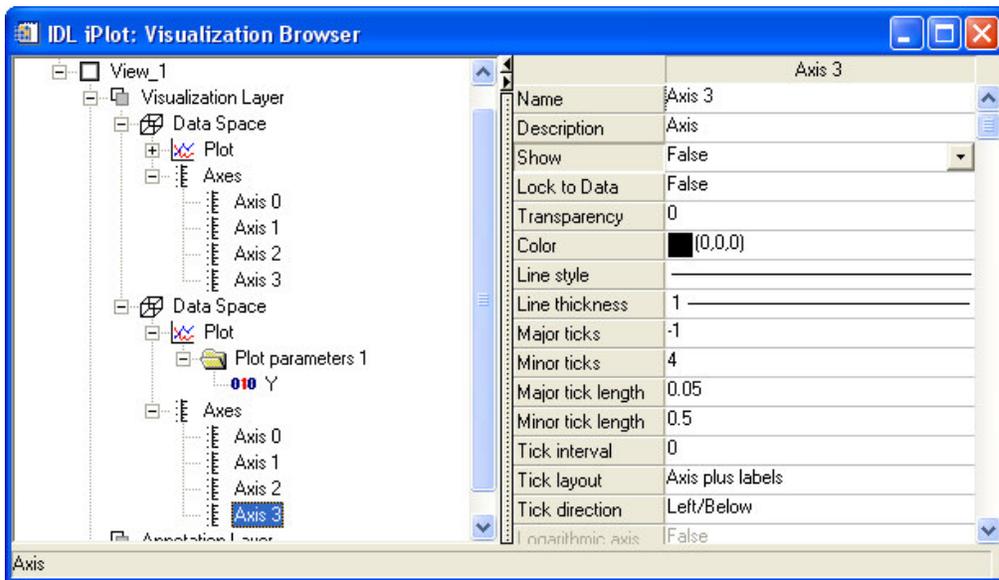


The result will look like the following:

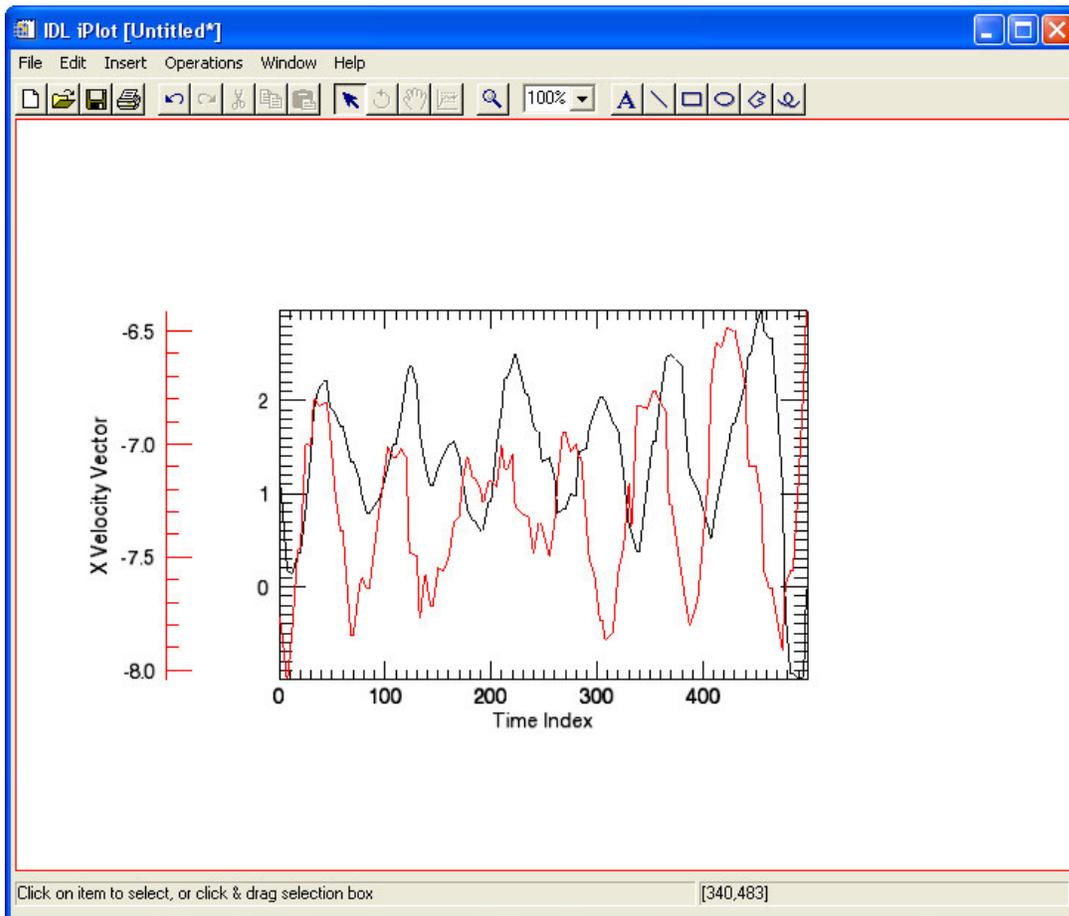


The final step is to clean up the right side Y-axis.

14) Select Axis 3 from the second listed Data Space. Set the Show property to False. To remove the axis entirely right mouse button click on Axis 0. When the context menu appears select "Delete"



The final plot will now be the following:



Extra:

This is not the only method for displaying data with multiple Y-axes. One other such display is shown below. The information presented in this document is all that you need to make the following plot. Give it a try!

