User Manual

Harry PLOTter

Team 7

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Contents

Chapter 1

Home Screen of Harry PLOTter

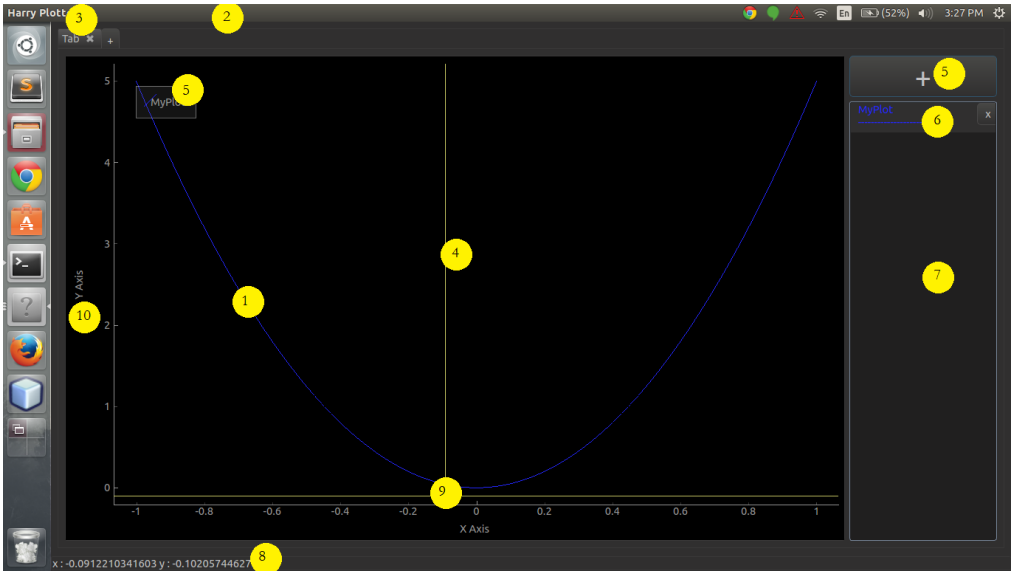

Figure 1.1: Home Screen of Harry PLOTter

Following is a brief description of the various components of the application :

1. **Plot** - drawn by the user
2. **Menu bar** - consisting of menus for various tasks
3. **Tab bar** - containing Add Tab and Close Tab buttons
4. **Plot area** - contains all the curves that are plotted

5. **Add Plot button**
6. **Plot Item** - representing a plot inside the Plot Area
7. **Plot Item List** - a container for holding Plot Items
8. **Status bar** - displays the x and y coordinates of the current mouse position for 2D graphs
9. **Lines intersecting at mouse position**
10. **Y axis label**
11. **X axis label**
12. **Legend**

1.1 Tab Bar

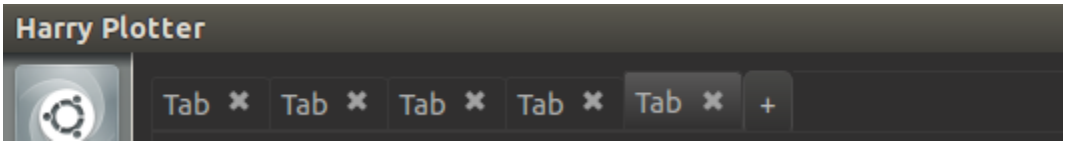

Figure 1.2: Tab

Harry PLOTter allows the user to use multiple tabs in a single user session, thus enabling the user to work on multiple plots independently. Each tab can contain multiple plot lines or surfaces of the same type i.e. either 2D or 3D.

1.2 Plot Area

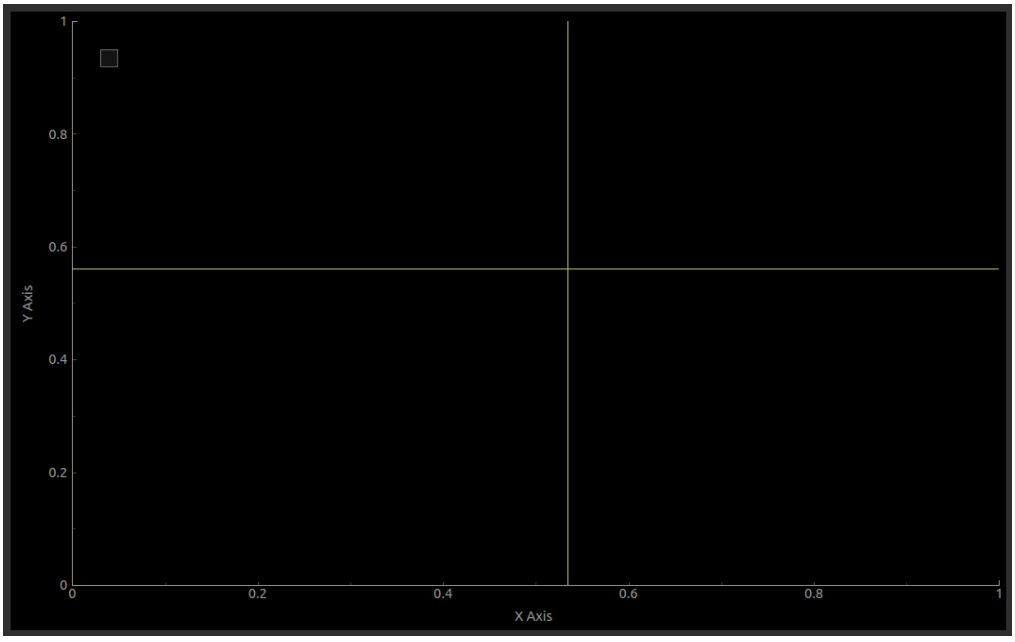

Figure 1.3: Plot Area

The Plot Area shows the different graphs plotted in this tab. It automatically adopts the 2D or 3D mode depending on whether the current tab is being used for 2D or 3D plotting.

1.3 Add Plot Button

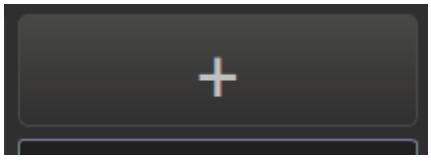

Figure 1.4: Add Button

The Add Plot button opens the Graph Specification Dialog box, which allows the user to specify the details required for adding a new plot to the existing tab.

1.4 Plots List

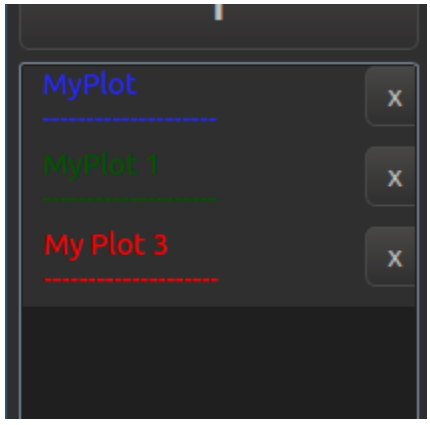

Figure 1.5: List of Plots

The Plots list to the right of the plot area shows the plots drawn in the current tab as items. Double-clicking an item enables the user to edit the properties of the plot. The user can delete a plot by clicking on the 'X' button on its list item.

Chapter 2

Essential Features

2.1 Graph plotting

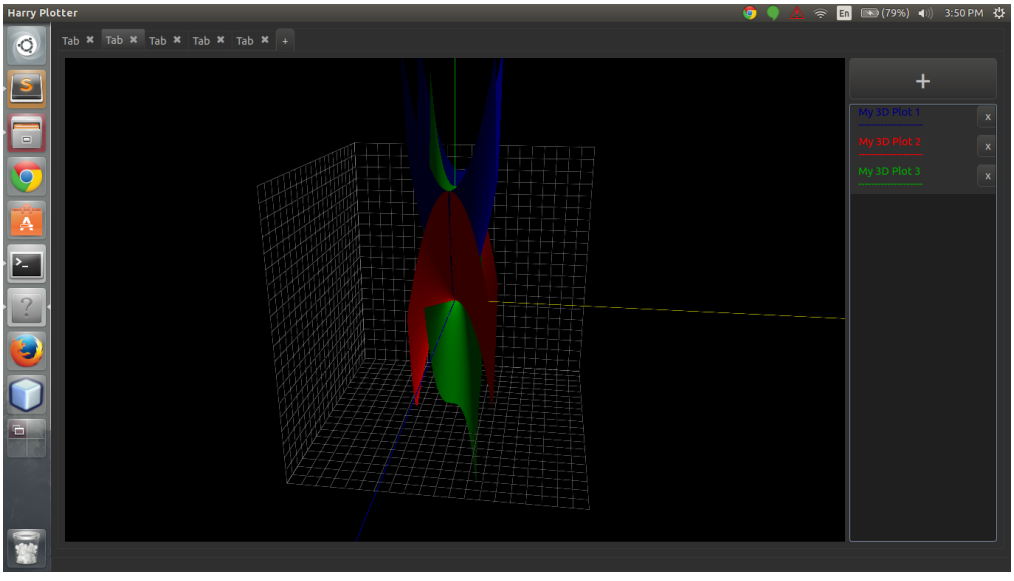

Figure 2.1: 3D Plot

Harry PLOTter supports both types of graph plotting - from a user-given expression and from file. The steps of plotting these graphs are discussed in the following sections.

2.1.1 Plot from mathematical function

1. Click on Add Plot button on the home screen. A Graph Specification Dialog box appears on the screen.

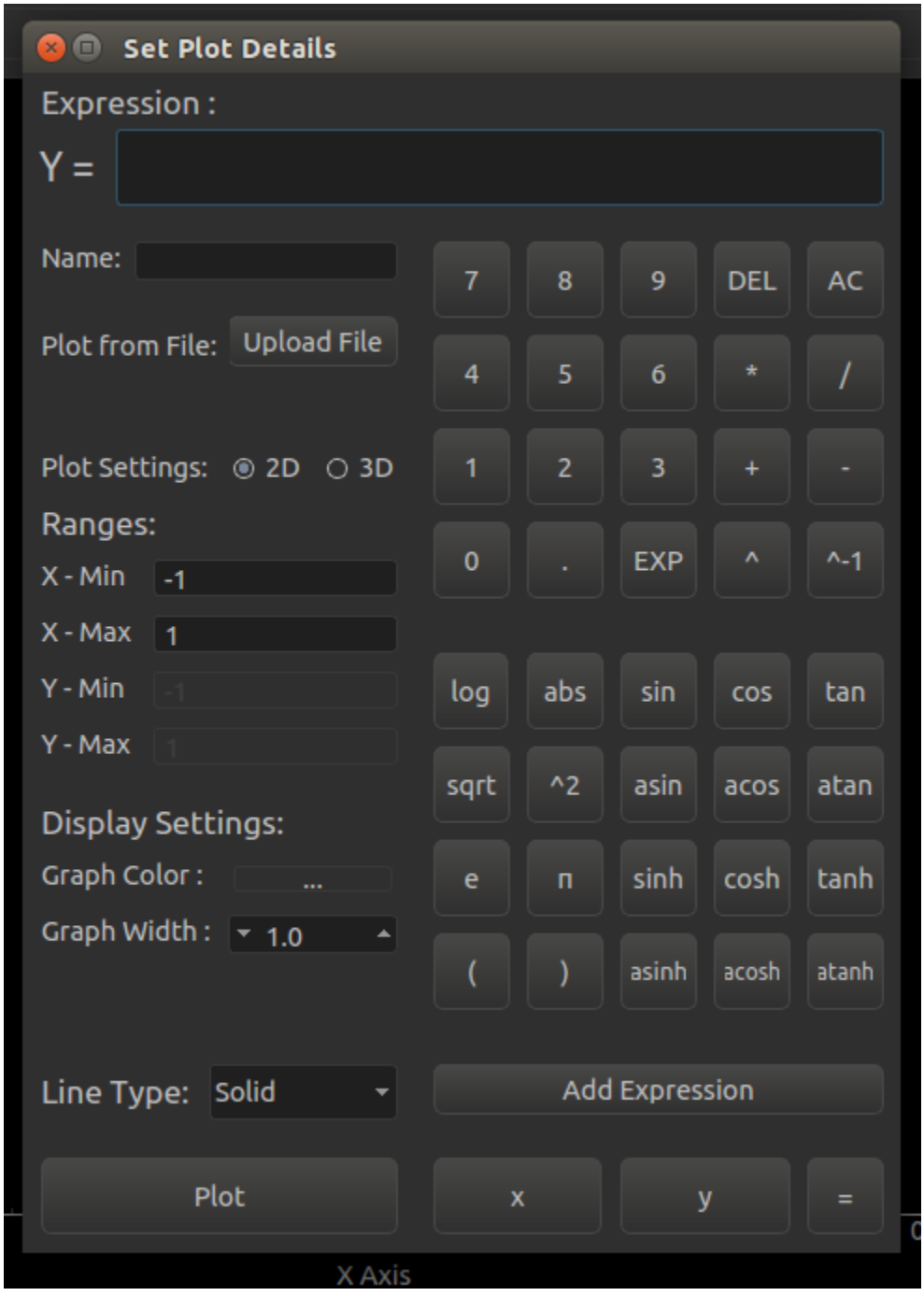

Figure 2.2: Graph Specification Dialog

2. Enter the function in the **Expression** field of the dialog box.

3. Enter the name of the plot in the **Name** field. If left empty, the function entered will be taken as the name of the plot.

4. Select whether the graph to be plotted is 2D or 3D.

5. Enter the range of axes. By default, all ranges are set to [-1, 1]. 2D graphs require the minimum X and maximum X ranges to be specified, while the 3D graphs also require the minimum Y and maximum Y ranges to be specified.

6. Under display settings, choose the graph color. If no color is specified, an arbitrary color shall be assigned to the graph.

7. Set the graph width (line width in case of 2D plot, and point size in case of 3D scatter plot).

8. In case of 2D plot, select the line type to be displayed.

9. In case of 3D plot, set the required opacity of the plot.

10. After all parameters have been specified satisfactorily, click on **Plot** to add the entered plot into the Plot Area of the current tab.

2.1.2 Plot from file

1. Click on Add Plot button on the home screen. A Graph Specification Dialog box appears on the screen.

2. Enter the name of the plot in the **Name** field. If left empty, the file name selected will be taken as the name of the plot.

3. Click on **Upload File** and browse the file containing the data to be plotted. The file name gets displayed below the Upload File button.

4. In case you wish to change the file, click on the cross button next to the file name (below the Upload File button) to de-select the file and then select a new file.

5. Under display settings, choose the graph color. If no color is specified, an arbitrary color shall be assigned to the graph.

6. Set the graph width (line width in case of 2D plot, and point size in case of 3D scatter plot)

7. In case of 2D plot, select the line type to be displayed.

8. In case of 3D plot, set the required opacity of the plot.

9. After all parameters have been specified satisfactorily, click on **Plot** to add the entered plot into the Plot Area of the current tab.

2.2 Graph Zoom/Pan/Rotate

The application provides the user with options to conveniently view the plots as per his/her need. The 2-Dimensional plots can be panned through dragging and zoomed through scrolling as per the user's requirement. The 3-Dimensional plots can be rotated and zoomed through mouse for viewing the plot as per the user's requirement of the plot orientation.

2.3 Exporting a graph

Harry PLOTter allows the user to export a plot to various formats. A graph can be exported by right-clicking on the plot area in a tab, and clicking the 'Export' option.

2.3.1 Exporting a 2D graph

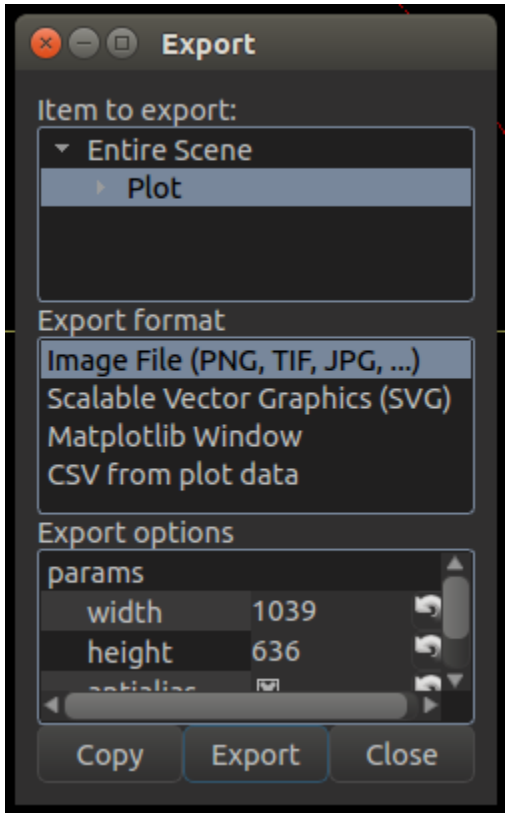

Figure 2.3: 2D Plot export

The allowed export formats for 2D graphs are :

- Vector formats : SVG
- Image formats : PNG, JPG, BMP, TIF, ICO, JPEG, PPM, TIFF, XBM, XPM, TIFF
- Others : Matplotlib window, CSV

For 2D plots, exporting shows a dialog box which can be used to select the required export format.

2.3.2 Exporting a 3D graph

The allowed formats for 3D graphs are:

- Vector formats: EPS, PDF
- Image formats: PNG, BMP

Chapter 3

Additional features

3.1 Standard Expression Support

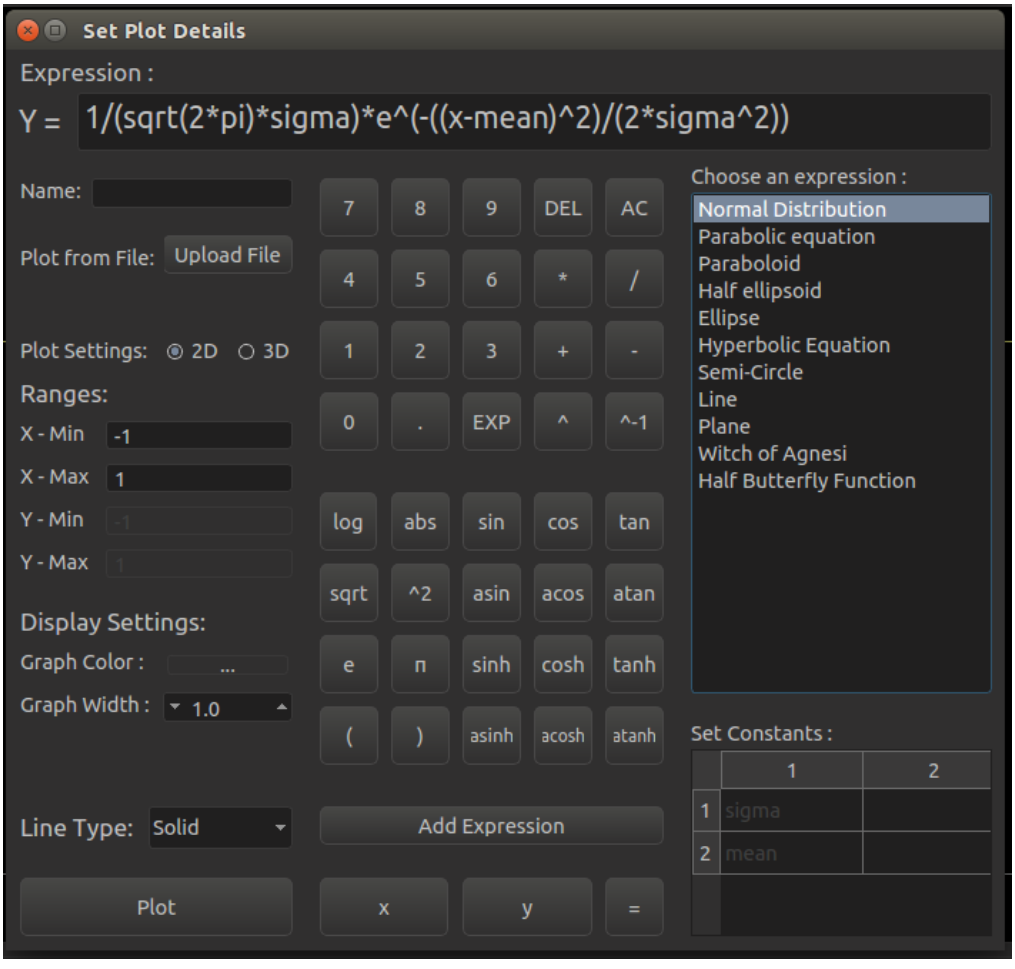

Figure 3.1: Standard Expression Templates

Harry PLOTter provides the user a set of Standard Expressions, which the user can select in the Graph Specification Dialog. The expressions can be selected by clicking on the 'More Expressions' button on the calculator portion, and selecting the required expression from the list of expressions. The list of expressions given in the application are:

- Normal Distribution
- Parabolic Equation
- Paraboloid
- Half-Ellipsoid
- Ellipse
- Hyperbolic Equation
- Semi-circle
- Line
- Plane
- Witch of Agnesi
- Half-Butterfly function

The constants in the expressions are to be specified by the user in the 'Constant Values' table present below the Expressions List, which are automatically replaced in the expression in the Expression box.

3.2 Legend Display for 2D plots

Figure 3.2: Legend

The application displays the legend for the plots in the plot area, where the plots are displayed. In the legend, the name of each plot is shown against the line type of the plot.

3.3 Transformation of 2D axes into log scale

The user can transform the axes into log scale for easily analysing functions involving exponents and logarithms. This can be achieved by right-clicking the 2D graph, going to 'Plot Options' → 'Transform' and selecting 'Log x' or 'Log y'.

3.4 Specifying the range of axes in 2D graph

The user may want to view only some part of the graph, in which case he/she may want to set the range of x and y axes visible in the graph. The range of x-axis can be set by right-clicking inside a 2D Plot Area and going to the 'X Axis' menu.

There, the user can check the 'manual' radio button and specify the minimum and maximum x values to be present on the x-axis. He/she may also specify a percentage with respect to the original range of the x-axis to be displayed by checking the 'auto' radio button and entering the percentage.

The same can be done for the y-axis.

3.5 Drag and Drop functionality

Harry PLOTter provides a *Drag-and-Drop* functionality, through which files can be dropped in the Plot Area in a tab, and this opens a Graph Specification Dialog with the dropped file shown as selected.

3.6 Plotting the average of 2D graphs

The user can plot the average of the 2D plots drawn inside the same graph. This can be done by right-clicking on the 2D graph, going to 'Plot Options' → 'Average' and clicking inside a small box beside the word 'Average'.

3.7 Theme Selection

The theme for the application can be selected in 'Settings' → 'Themes' in the Menu bar. Two themes are supported, 'Black' and 'White', either of which can be selected based on the user's taste.

3.8 Axes Specification

The user can specify the 'Title' and 'Unit' of the axes of the graphs through 'Settings' → 'Change axis specifications' in the Menu Bar, as per his/her requirement.

3.9 Short-cuts

The application provides short-cuts for the user's convenience. These include:

- 'Ctrl' + 'n': Opens a new Graph Specification Dialog.
- 'Ctrl' + 't': Opens a new Tab.
- 'Ctrl' + 'w': Closes the selected Tab.

3.10 Session management

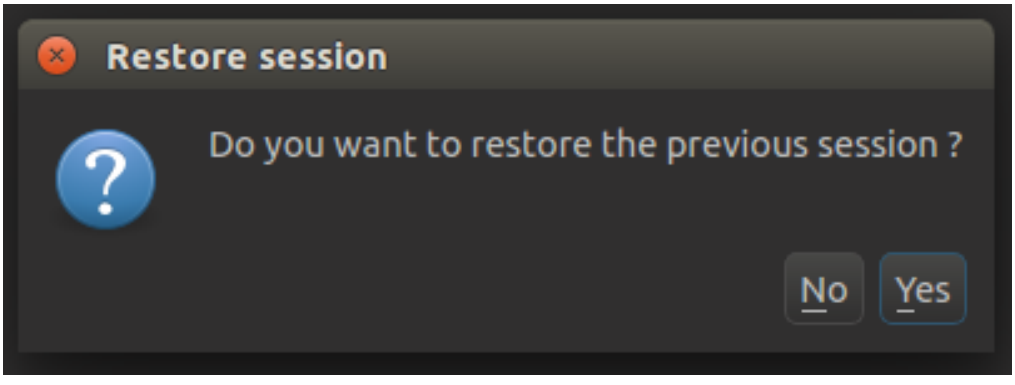

Figure 3.3: Session Restoration Prompt

Harry PLOTter saves the current user session when the user exits the application, and provides the user an option of restoring the last session when the software is run next time via a prompt at the beginning of the application.