Data Analysis GUI Documentation

GUIDE

Terminology

GUI – Graphical User Interface

Log-File – File containing data of interest which is generated by user's software

Data field – A set of data associated with a variable of interest

Header – The first lines of the log-file containing comments, names of data fields and units

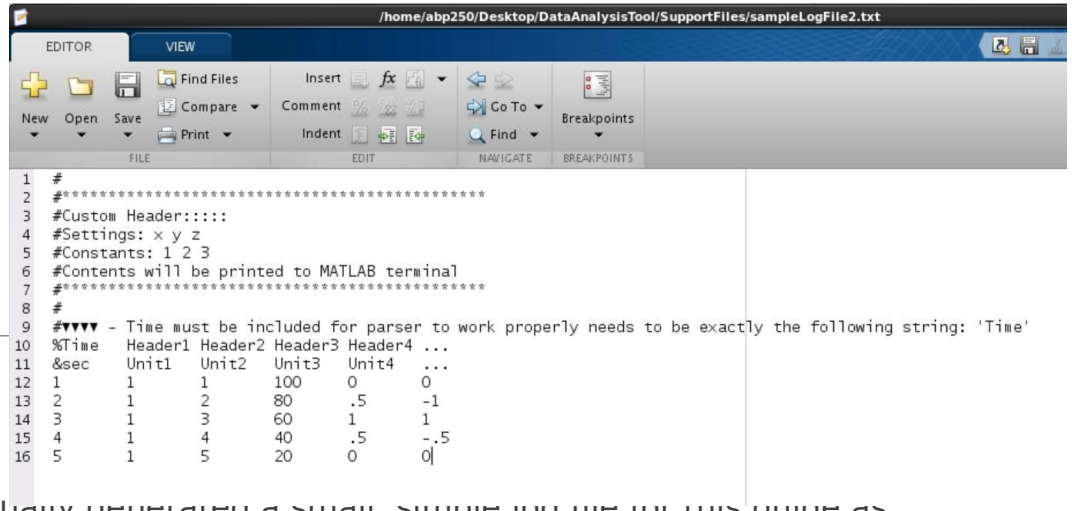
Parse – Processing of a log-file to change the format of data.

Figure - MATLAB refers to "windows" as figures. Such as a pop-up dialog box or a GUI.

Plot – An axis which is a visual representation of data. Can be anything but for our purposes, it is a time domain digital signal.

Contents

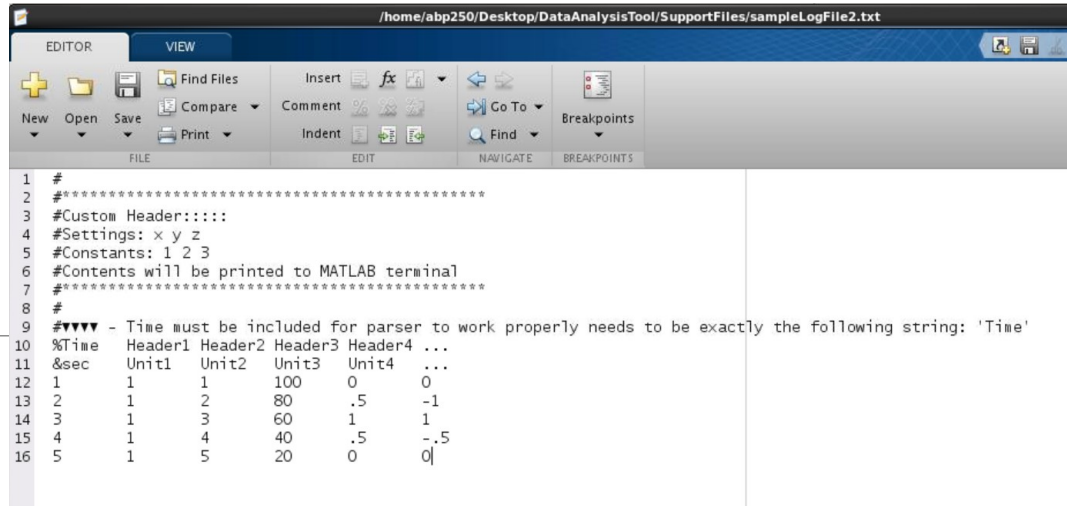
Log-File



Format

- Obtaining a Log-File
  - The way you generate a log file is up to the user. For simplicity, I manually generated a small, simple log file for this guide as shown.
- Headers - All header lines begin with the characters #, % and &
  - Each line beginning with one of these characters at the beginning of the file will be considered by the parser as a header. They will be treated differently corresponding to which of these characters is used.
  - For & and % and all data lines which will not have headers, There must be a tab (\t) in-between the headers, units or data values.
- # Headers - Comments
  - These headers are solely meant for comments and as a way to display settings.
  - They will be printed to the MATLAB command terminal when being parsed.
- % Headers - Names
  - These are the name headers for the data fields. They will be stored in the M-file.
  - Time must be the first unit and it must be the exact string ‘Time’. If it is not, the log will not be parsed.
- & Headers – Units
  - This header line is reserved for Units of the corresponding data fields.
  - There must be as many units as headers as well as data fields.

Log-File



Potential Issues

- There are unmatched Units, Names or Data
  - One or Two of the numbers of Units, Names or Data does not match the others.
  - This is most likely a logging problem and can be fixed by adding or removing the needed lines.
  - It can also be caused by having too many tabs between data values. The parser will see an empty data value in-between two tabs.
- Could not find &, # or % headers
  - You need to include which ever header is missing to the log file.
  - Can be fixed by adjusting the logging to include the missing header.
  - Also might be because the order of the headers is wrong.
    - The # headers must be first. The order of the & and % headers does not matter but it is suggested to have the % before the & headers.

Running the GUI

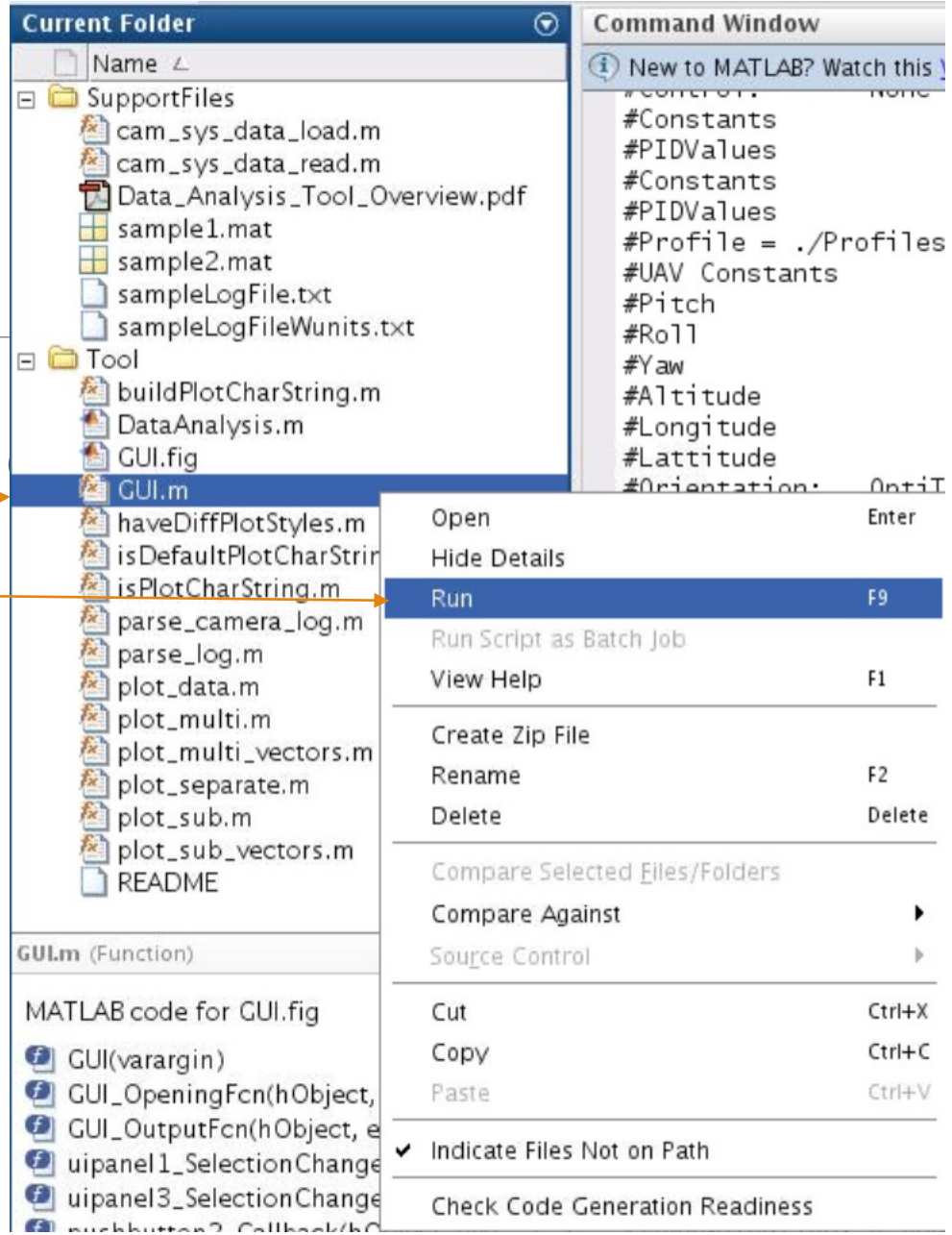
Requirements

- MATLAB(Linux or Windows) Version R2014b or higher (will probably work on previous versions, but not tested)
- GUI.m – Matlab code file which determines functionality of the GUI
- GUI.fig – figure file which generates GUI graphics
- parse_log.m – log parser function used by the GUI

Running the GUI

Steps

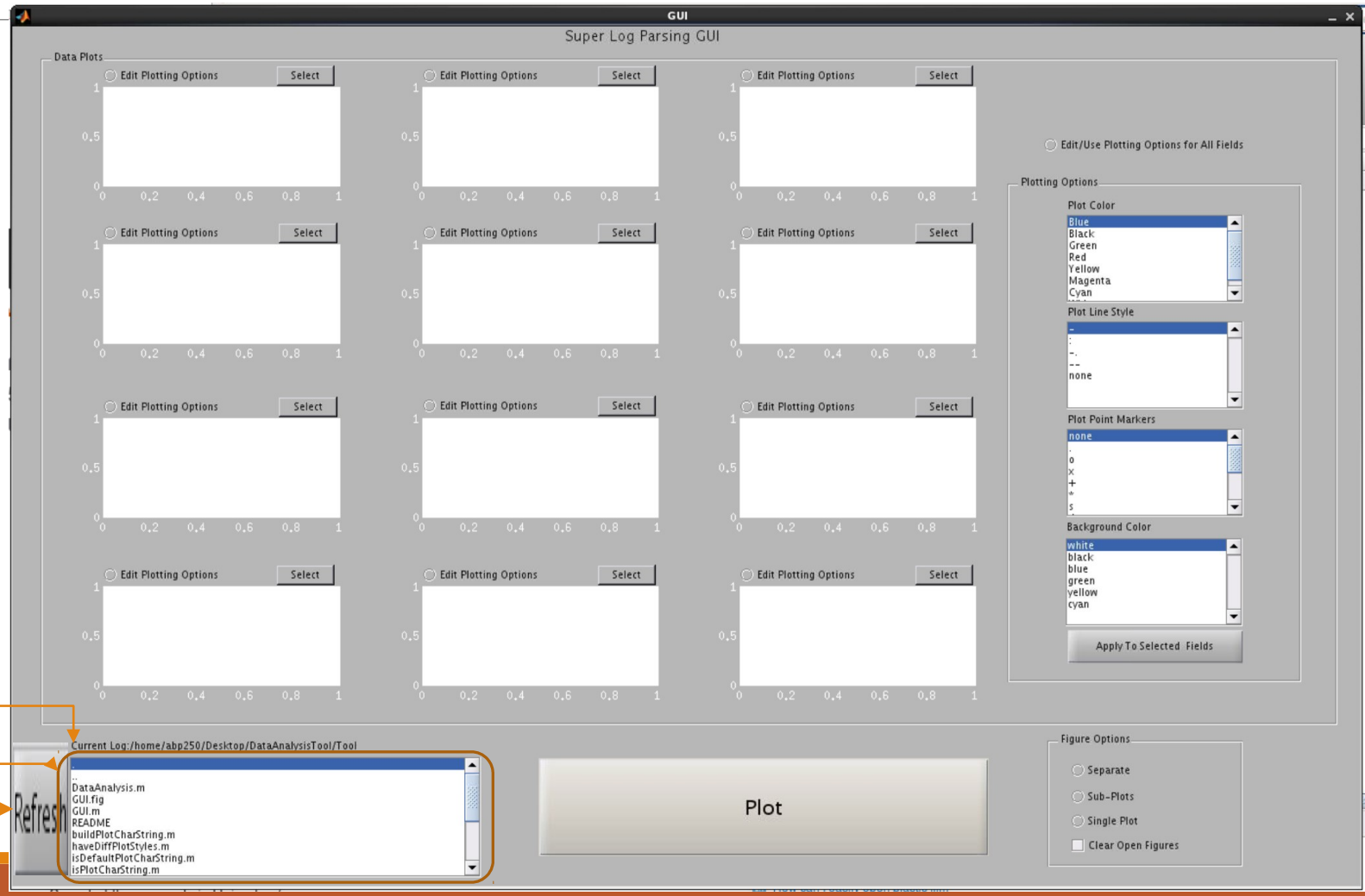
- Navigate to the directory containing GUI.m and
- Right click on GUI.m
- Click Run
- Wait a few seconds and the GUI should open



Input/output Data

Navigating In-GUI browser to Log-File

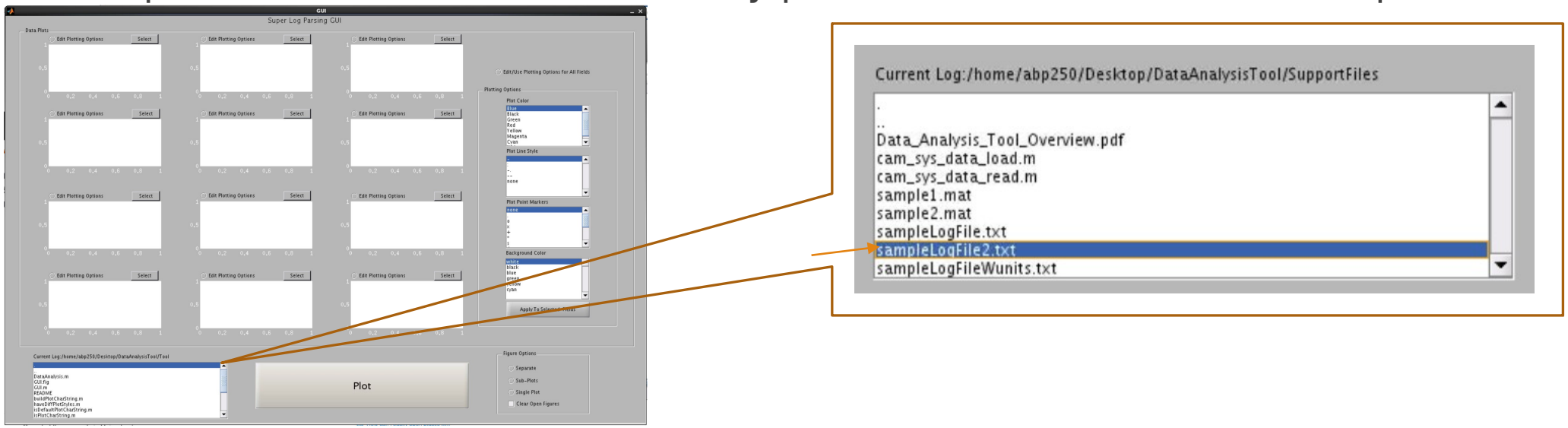
- Double-Click on Listbox entries to change directory until you find the log-file directory
- The current log or directory will be displayed above the listbox
- There is a refresh button which will load any files that have changed since the list box was last loaded.



Input/output Data

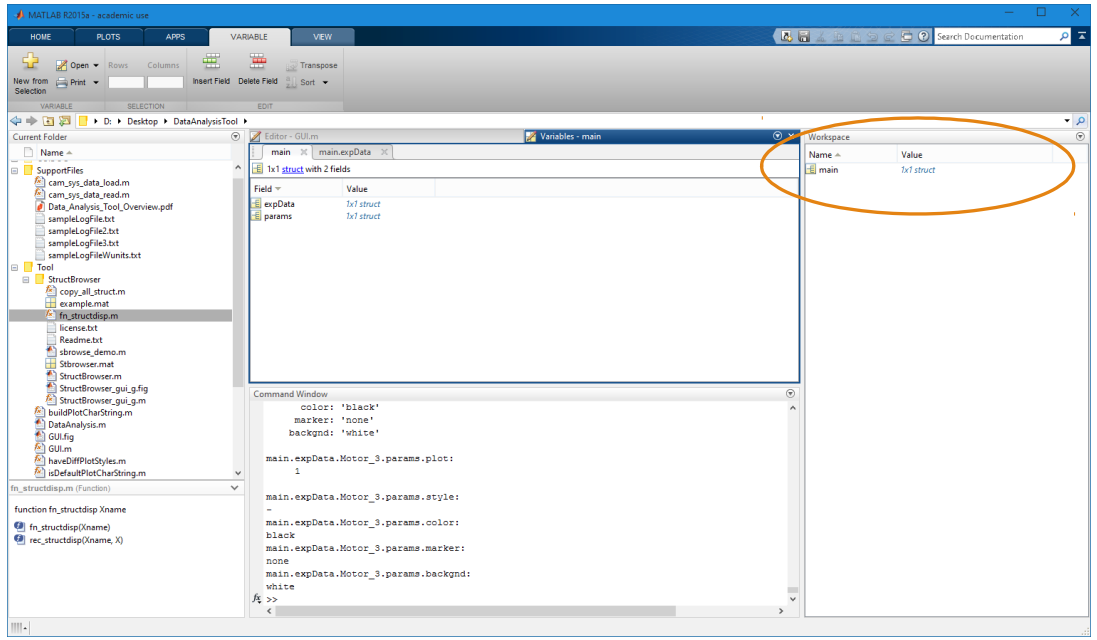
Navigating In-GUI browser to Log-File

- Once you reach the Log-file location, Double-click the Log-file and the data will be parsed
- Once parsed, The GUI will automatically plot the data on the axes and export the



Input/output D

In the MATLAB workspace, the “main” structure will be constantly updated by the GUI with settings and data. The format of this structure is shown to the right.

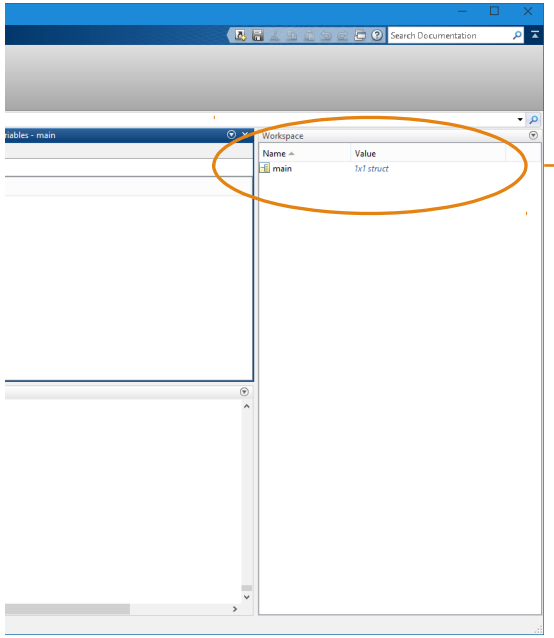


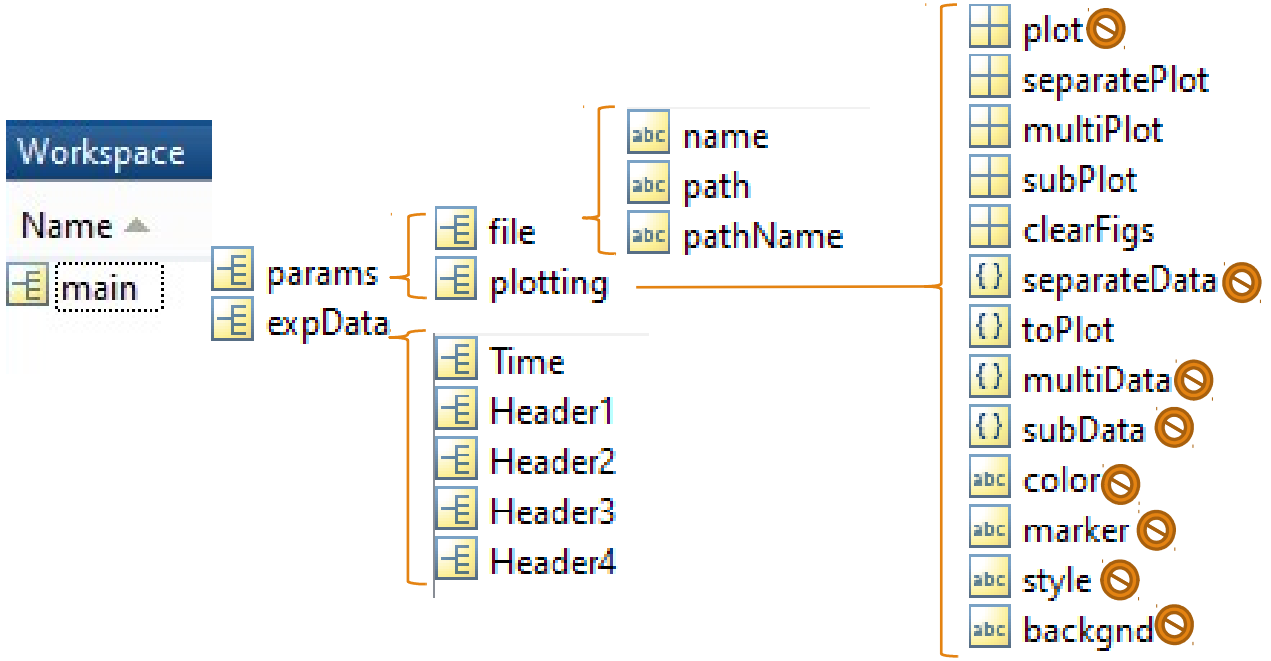
M-File Format

I. main
  I. params
    I. file
      I. name
      II. path
      III. pathName
    II. plotting
      I. plot
      II. separatePlot
      III. multiPlot
      IV. subplot
      V. clearFigs
      VI. color
      VII. marker
      VIII. style
      IX. backgnd
  II. expData
    I. <datafield header> (repeated for all datafields)
      I. data
      II. unit
      III. params
        I. plot
        II. style
        III. color
        IV. marker
        V. backgnd

Input/output Data

Here is a more visual representation of the structure:

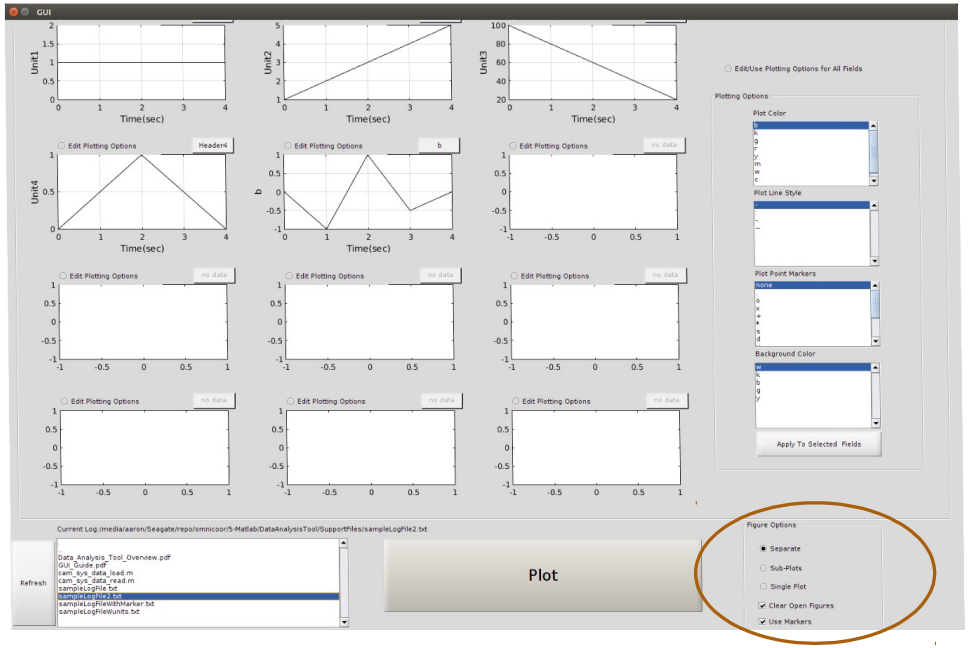




Not used by GUI

Setting and Changing Parameters

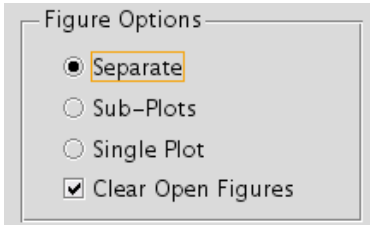
1. Plot methods
   1. Separate plots
      - This option creates a separate figure plot for all selected fields to plot
   2. Sub-plot
      - This option creates one figure(window) with sub-plots. The number of sub plots is automatically calculated and adjusted by the GUI depending on how many fields are selected.
   3. Single Plot
      - This plots all selected fields on to ONE plot. It is suggested to change the color of each field.
   - Clear Open Figures
      - Self-explanatory. Closes the open figures automatically when you plot again in case you don't want too many windows in the taskbar.
   - Use Markers
      - Previews and also plots Markers on all plots. Previewing markers takes up a lot of time when running the GUI so this can be useful.

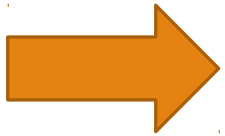


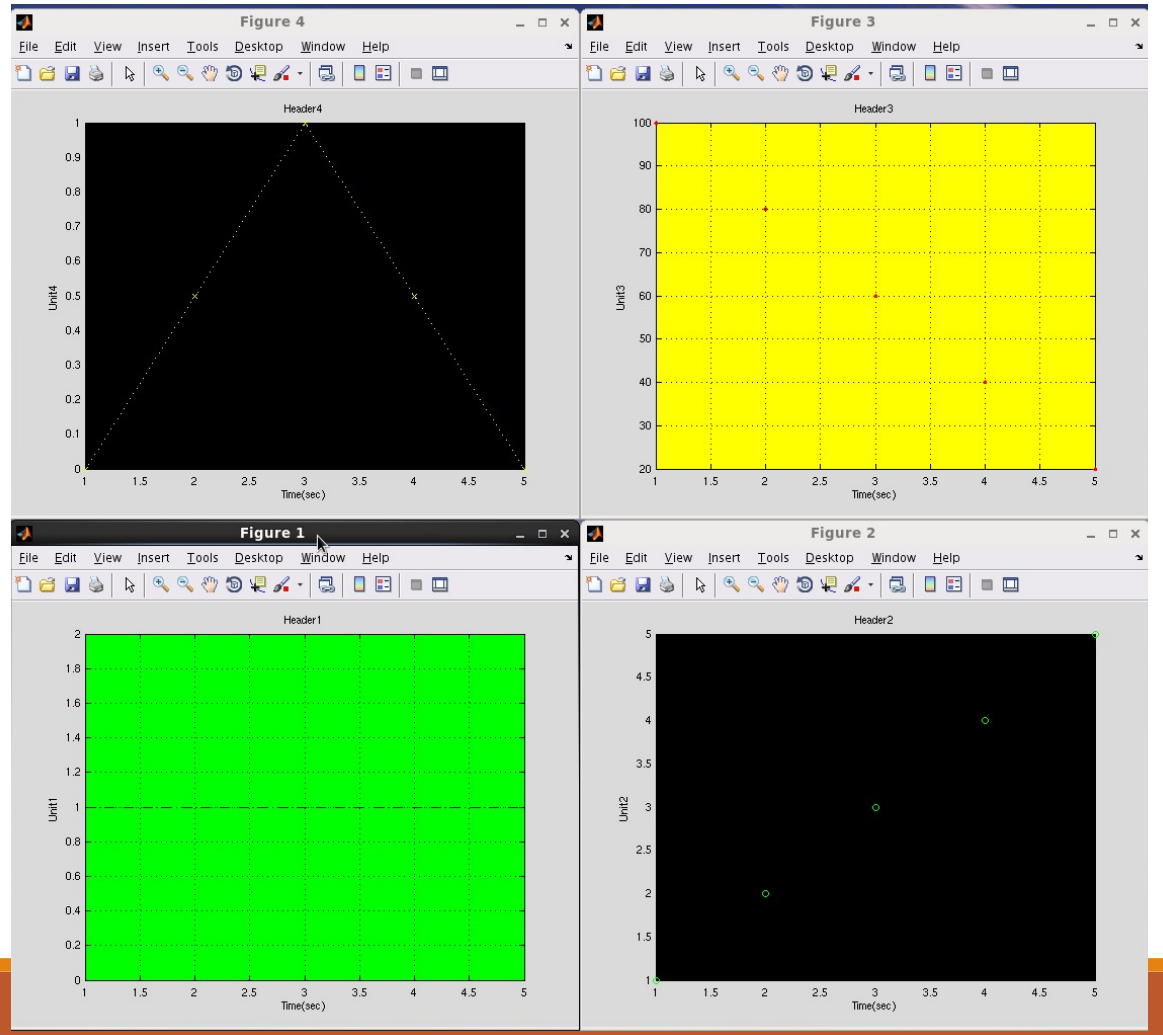
Setting and Changing Parameters

Plot methods

Separate plots



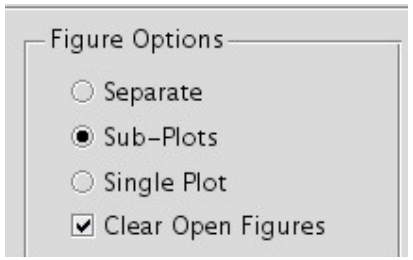


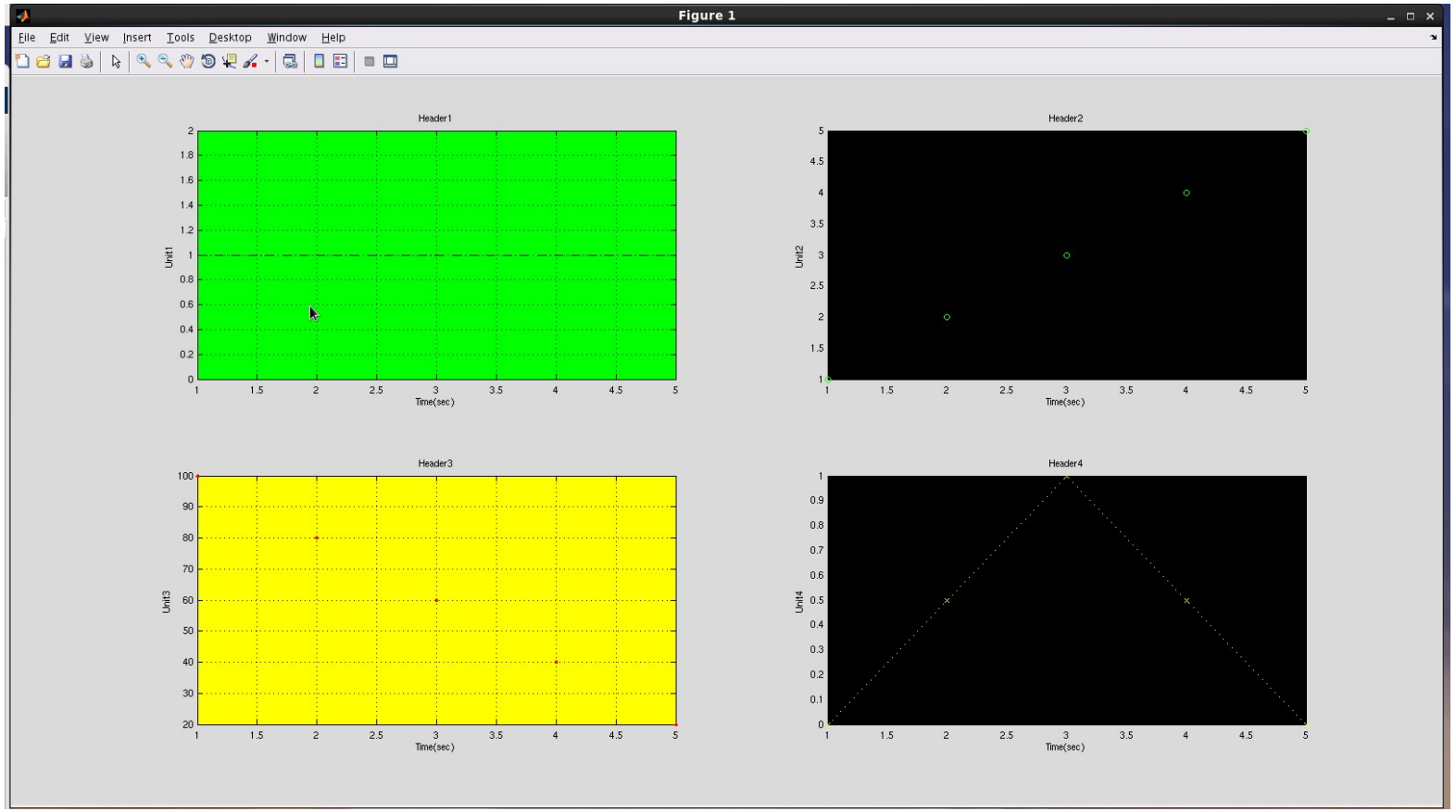


Setting and Changing Parameters

Plot methods

Sub-plot

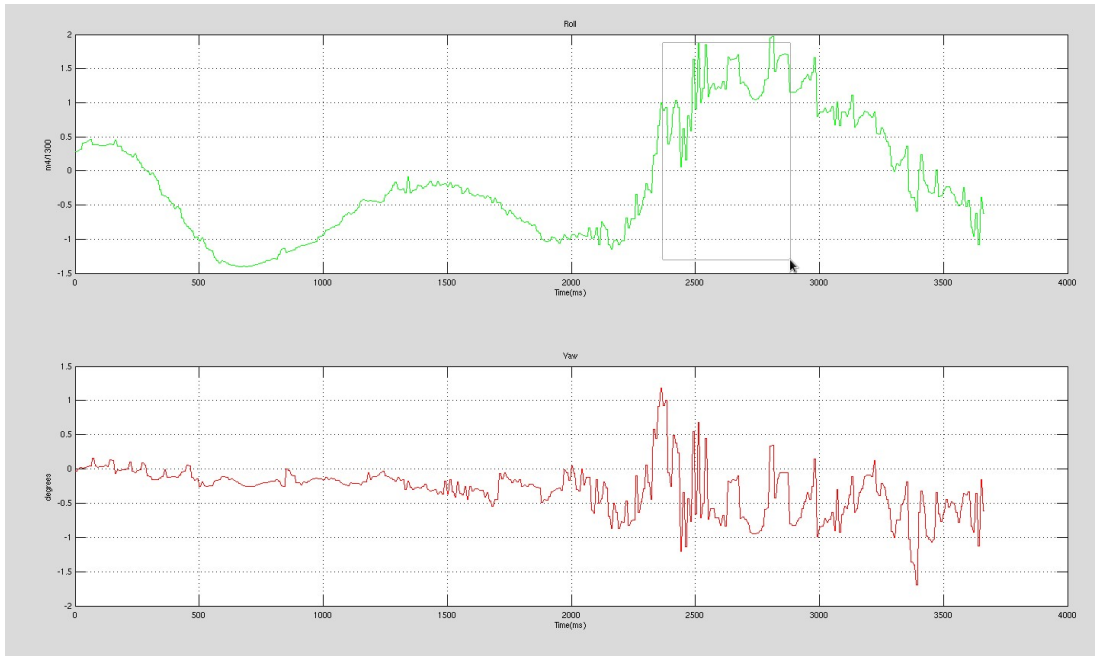


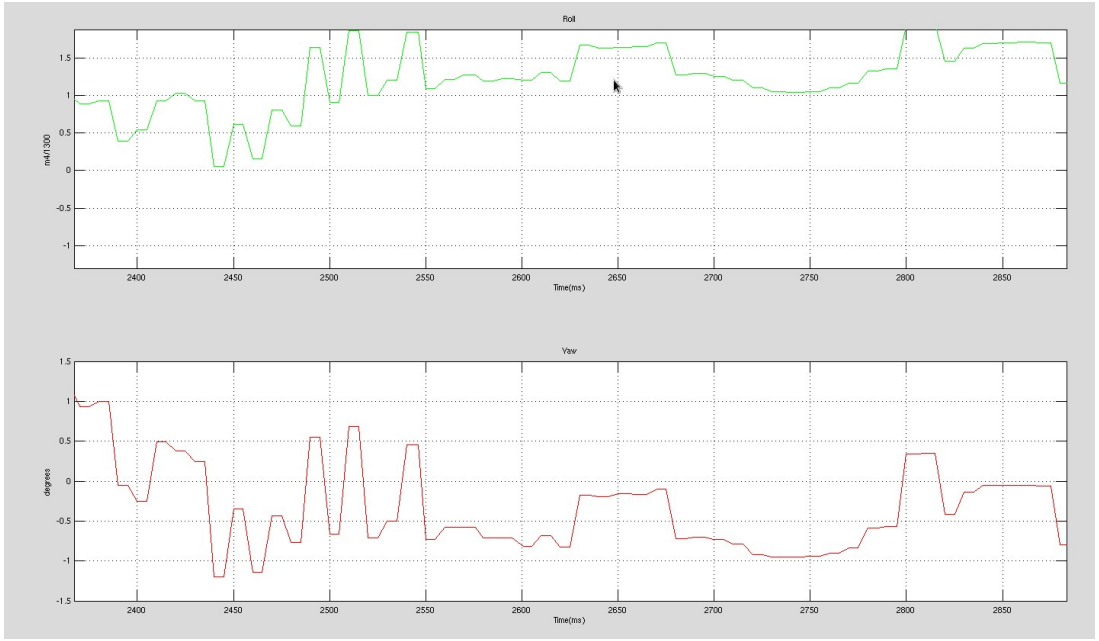


Setting and Changing Parameters

Plot methods

Sub-plot Note: zooming in will zoom in the X axis on all plots as show below..

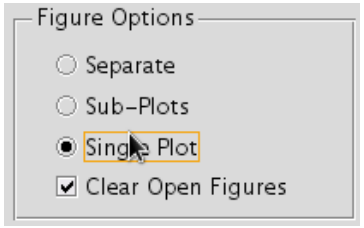




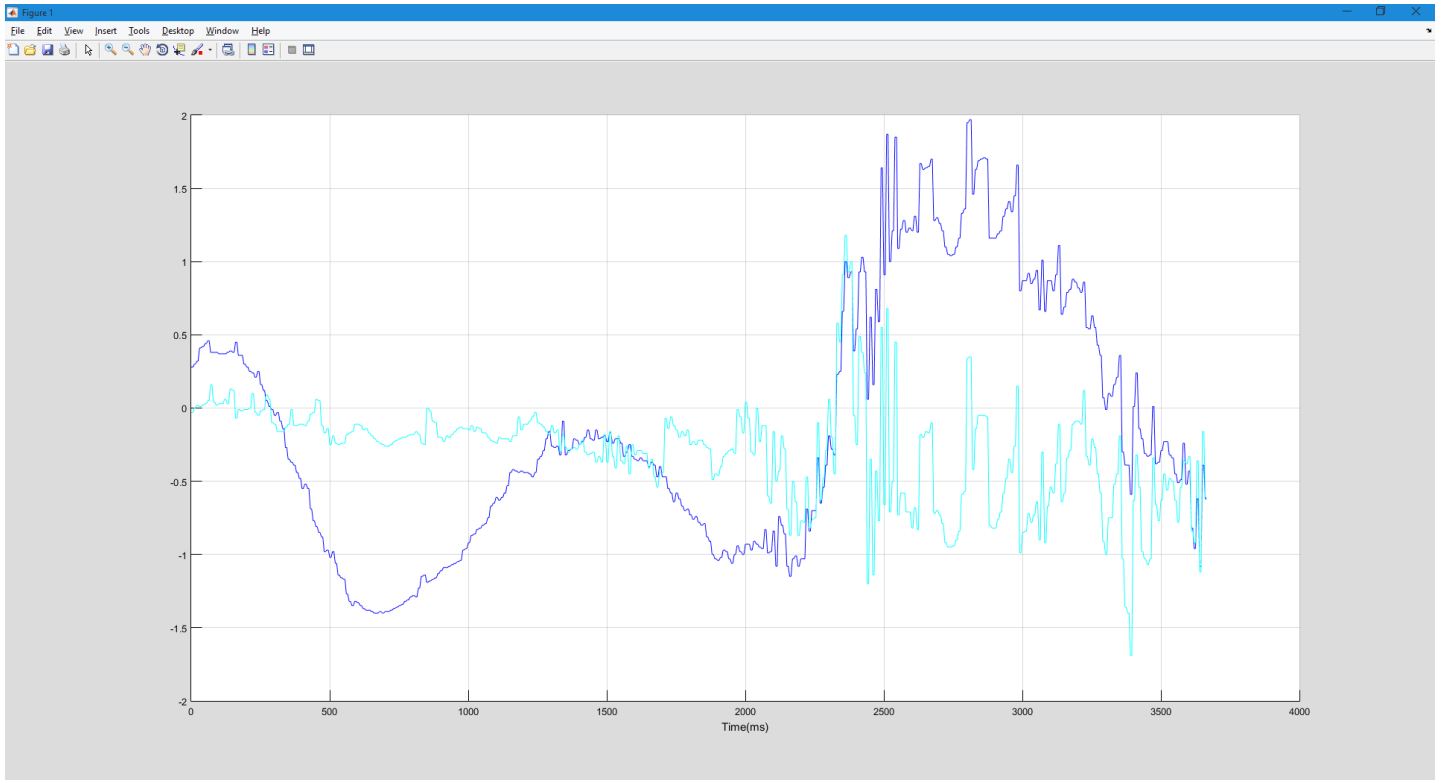
Setting and Changing Parameters

Plot methods

Single Plot



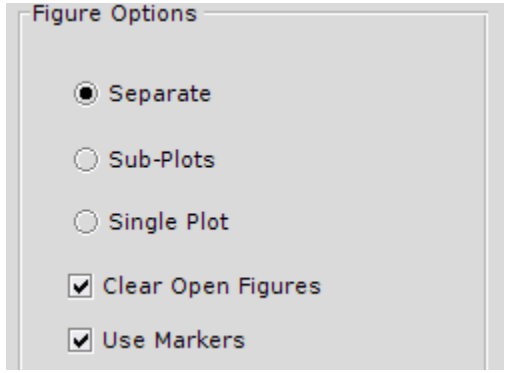
Note: This option will not display y-axis units because there are potentially multiple different units corresponding to the data being plotted.

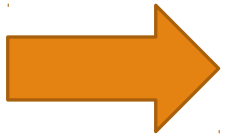


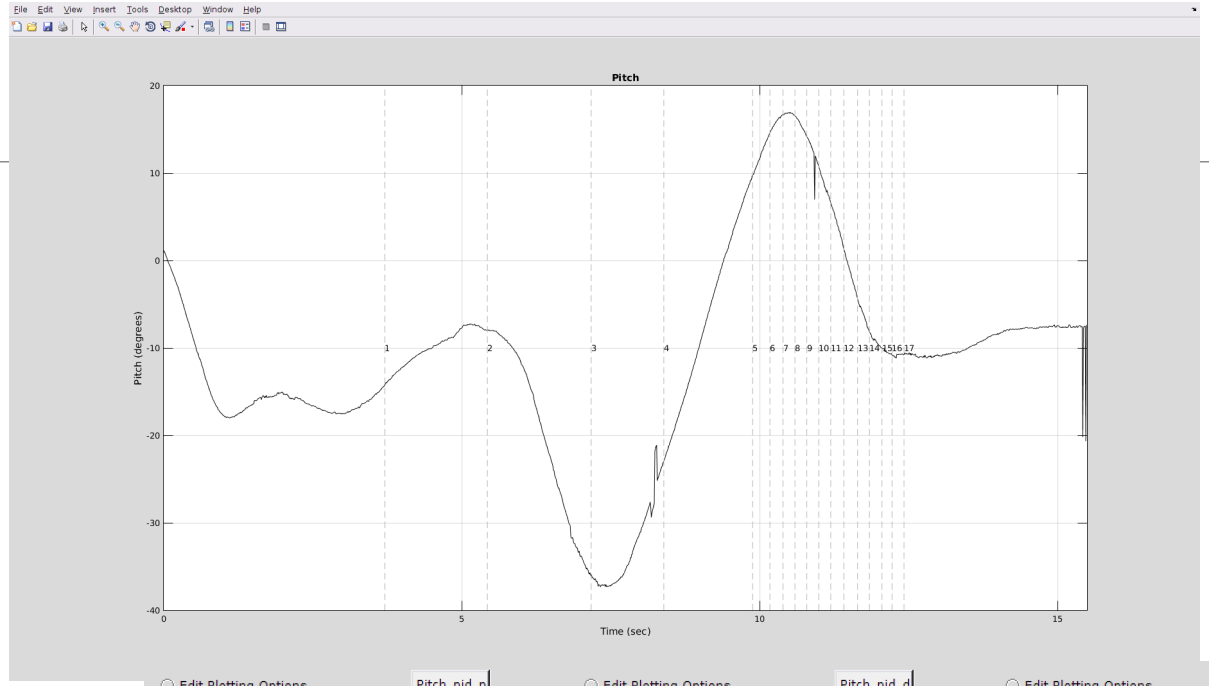
Setting and Changing Parameters

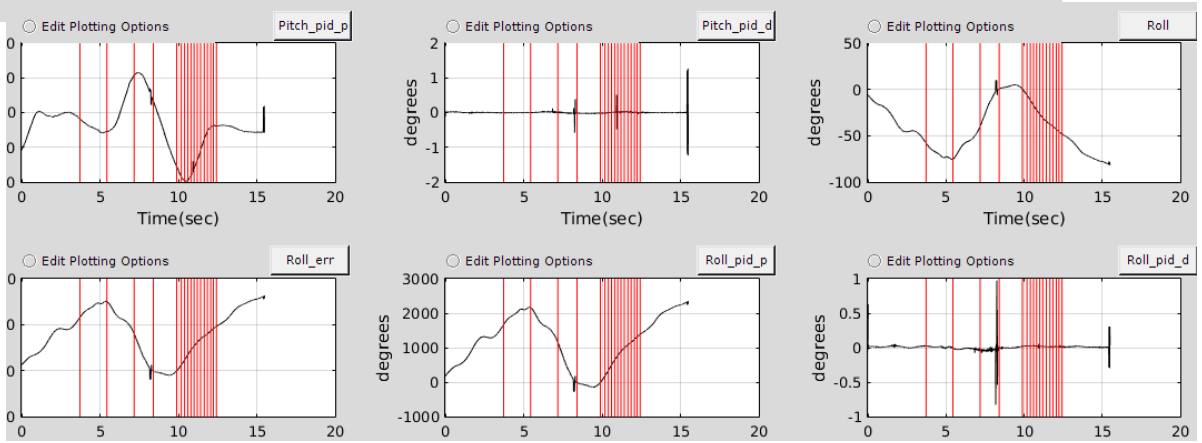
Plot options

Use Markers







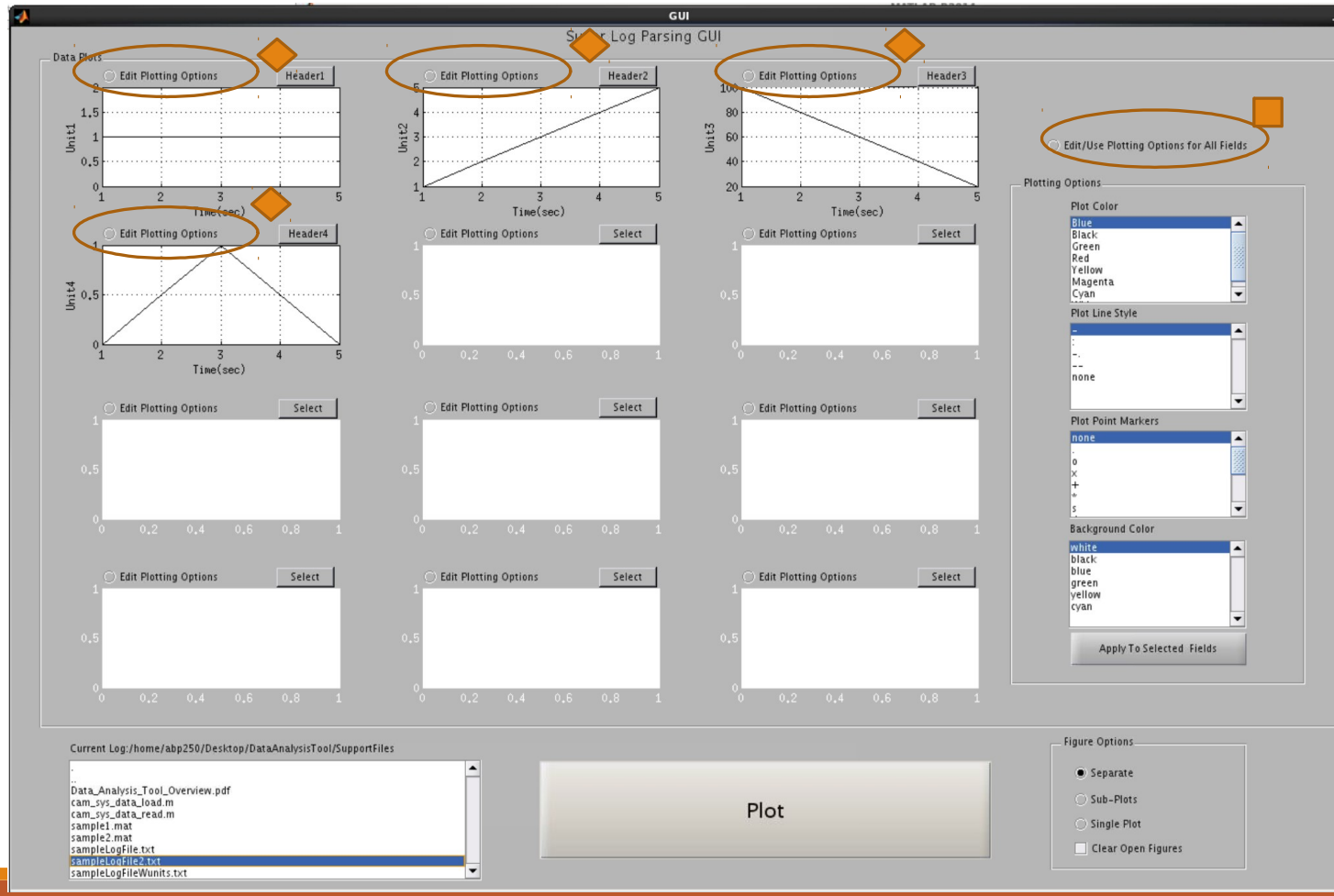


Note: The GUI takes a long time to preview when all the markers are plotted.

Setting and Changing Parameters

Changing Plotting Options

1. Select a field for which you would like to change the settings
2. Alternatively, You can have all plots use the same options by selecting the radio button above the plotting options UI-box

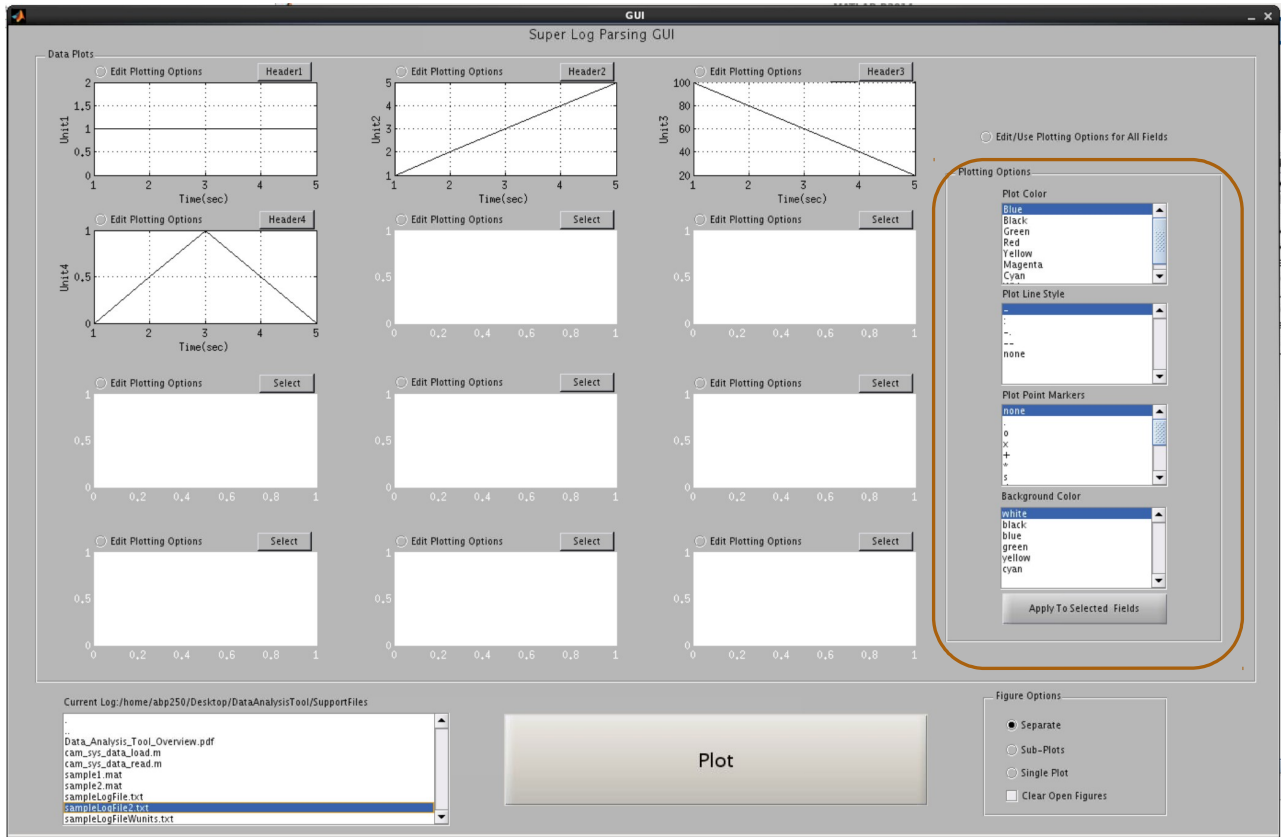


Setting and Changing Parameters

Changing Plotting Options

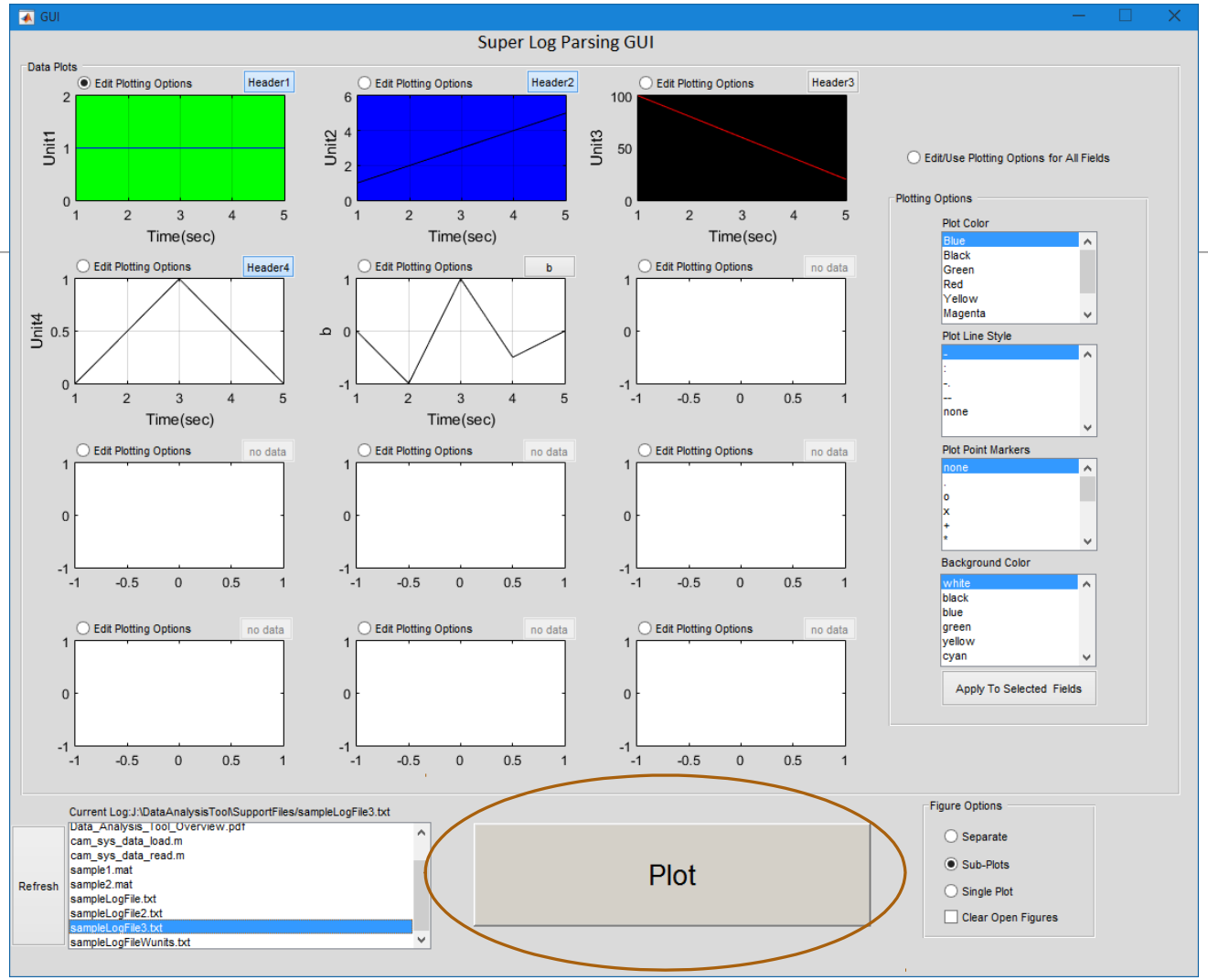
1. Then, Select the desired settings
   1. Plot Color
      - Changes the color of the plot line or marker
   2. Plot Line Style
      - Changes line which connects data samples to the desired style. Can be dashed, dotted and dash-dot or no line at all.
   3. Plot Point Markers
      - An option to mark data samples with a character.
   4. Background Color
      - Changes the background color of the plot

   Note: The background color for the single-Plot Plotting method will always be white because there are multiple fields in one plot.



Plotting

Press the large Plot button at the bottom



Potential Problems with Solutions

- Log file Format
  - There are unmatched Units, Names or Data
    - One or Two of the numbers of Units, Names or Data does not match the others.
    - This is most likely a logging problem and can be fixed by adding or removing the needed lines.
    - It can also be caused by having too many tabs between data values. The parser will see an empty data value in-between two tabs.
  - Could not find &, # or % headers
    - You need to include which ever header is missing to the log file.
    - Can be fixed by adjusting the logging to include the missing header.
    - Also might be because the order of the headers is wrong.
      - The # headers must be first. The order of the & and % headers does not matter but it is suggested to have the % before the & headers.
- Mat-Data Format
  - Most problems with the M-data are due to inconsistent data.
  - The go-to solution for these problems is to delete the main structure and re-import the data from the logfile.