PROCEDURE FOR OBTAINING NUMERICAL DATA FROM THE DATA SHEETS

The extraction of the numerical data will be done using the WebPlotDigitizer web tool https://apps.automeris.io/wpd/ following the next steps:

1. The data sheet is loaded in the application using the tool menu (File -> Load Image File(s) -> The corresponding file is chosen) or simply by dragging the pdf document to the work area. Next, the type of graph from which the data will be obtained must be specified, in this case select 2D (X-Y) Plot and click on Align Axes.
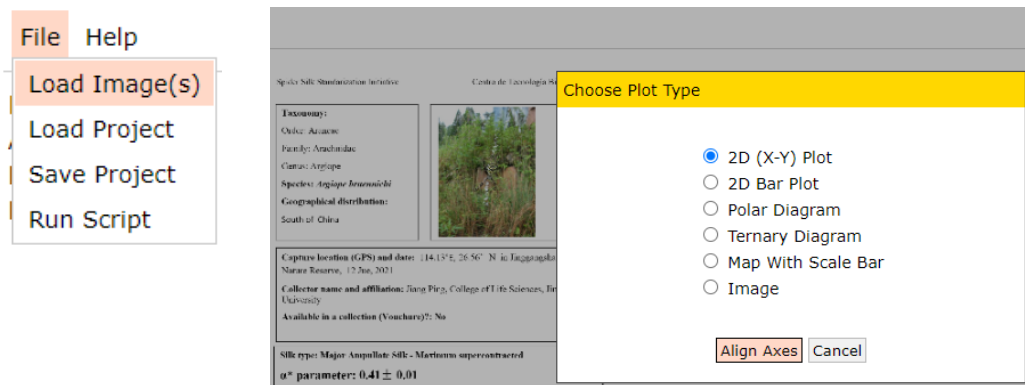

2. In order to define the area of the graph, four known points of the axes must be selected, two on each axis and as far apart as possible. To do this, click on Proceed in the point selection menu and select two points on the X axis and then two points on the Y axis (it is convenient to remember the values of the axis in which we have placed the points). The exact location of the points can be corrected by clicking on them and moving them using the mouse or the keyboard arrows. Once the points are well placed, click on Complete.
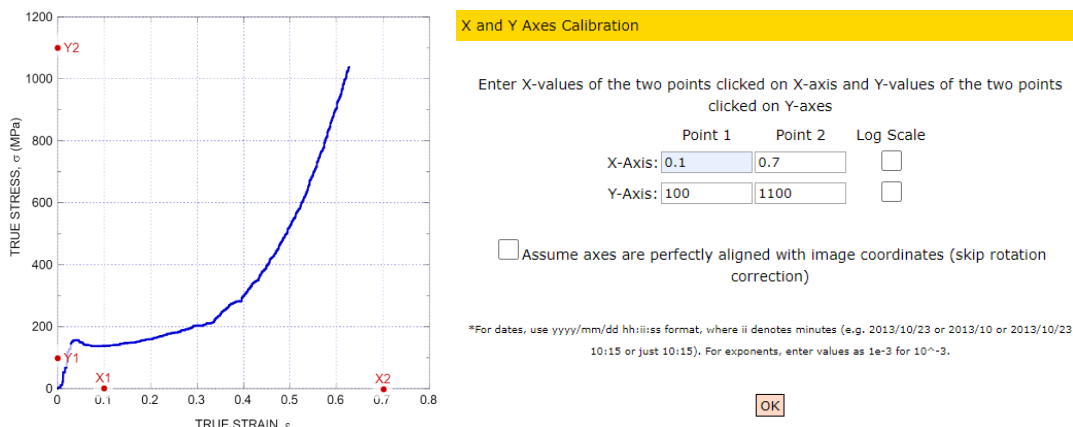
3. Next, it is necessary to indicate the numerical values of the axes on which the points have been placed (image above). When it is done, click Ok and the data extractor will open. At this point the proper placement of the axes, since when positioning on the graph with the mouse, it will indicate the X-Y coordinate in which the cursor is located. If when positioning over the axes with the cursor it indicates the correct values (see values in the enlarged graph in the upper right corner) we will have carried out the process correctly.

The data extractor will be used to select points within the graph from which we want to obtain the X-Y coordinates (the points of the stress - strain curve in our case). These points can be selected manually (by clicking on Add Point and selecting the points of interest on the graph), or automatically. Also, if the program makes a mistake, it is always possible to change some points by selecting the Adjust Point option from the manual extraction menu, and changing its position using the cursor or the keyboard arrows. Anyway, it will be more useful to use the automatic mode, which is explained below:

4. The first step is to create a mask on the line of data that we want to obtain. To do this, click on the Pen option in the Mask section, and traverse the stress-strain curve. The width of the cursor can be varied in the Width section. In addition, erroneous traces of the mask can be erased using the Erase option.
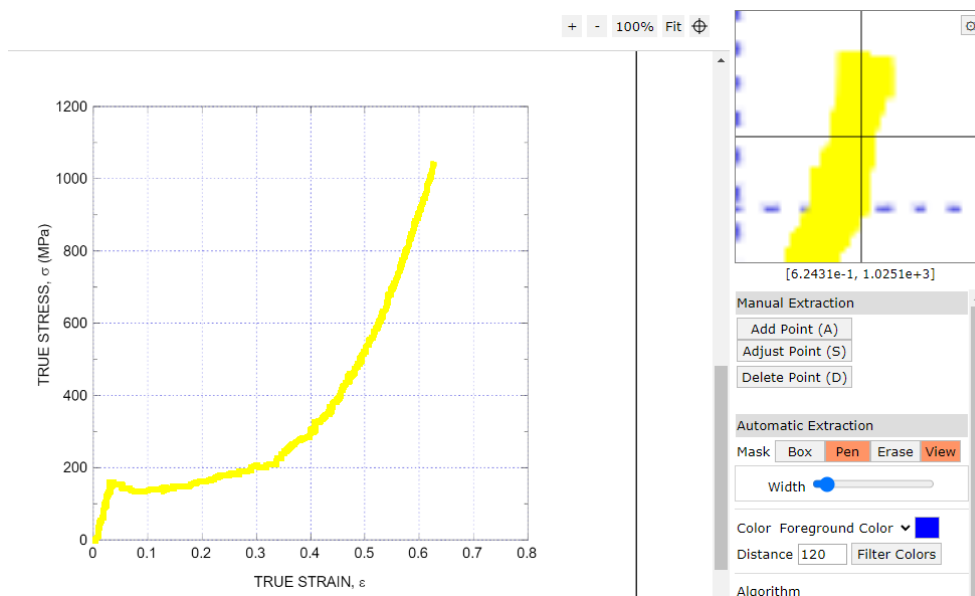
5. It is possible to select the color of the graph from which we want to obtain the data in the Color section. It is also possible to select the background color, or filter shades of color to select a single graph within a series with a lot of data.

Next, the algorithm that is required to generate the points of interest within the graph is selected. The most common will be to use the Averaging Window algorithm, although there are other options such as the X Step.

6. In the case of using the Averaging Window algorithm, the first step is to select the dimensions of the window. A larger window will result in fewer points and vice versa (a 5 – 10 pixel window should be enough). Once the window is defined, click on Run and see how the points have emerged. In the case of using the X Step algorithm, the limits of the graph (X_min X_max Y_ min Y_max) must be selected, in addition to the dimensions of the step Δx (a value of $\Delta x = 0.005$ should be enough). Once these parameters have been defined, click on Run and see how the points have emerged.
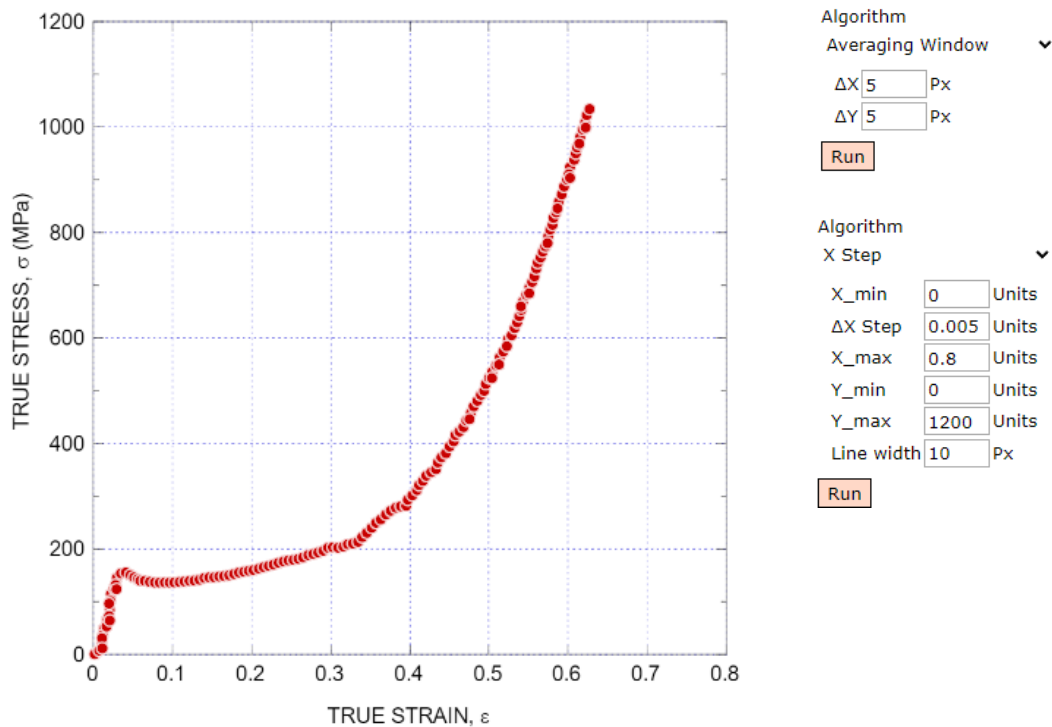
Finally, the data extraction is carried out. This is done from the menu at the bottom left (Dataset).

7. To extract the data, the option View Data is selected and a box that contains all the data will emerge. It will be necessary to change the format of the data to be able to export them to Excel without complications. First of all, the option 3 digits is selected in the Digits option as well as the Fixed option (instead of Ignore) on the right side. Subsequently, the command "\t" must be entered as Column Separator (it makes it possible to export the data in the form of two columns) and the option Format is selected.

At this point, it is possible to export the data by copying it to the clipboard (select the Copy to Clipboard option) or by downloading a file in .CSV format. Note that in the exported data the decimal separation is done with commas, so it may be necessary to change the decimal indicators in Excel for the data to be consistent.