

## Appendix B -- Submitting Assignments

### 1 Assignments should be turned in as pdf files of figures with captions.

Each assignment should be submitted as a pdf file attached to an email message. Build the filename by combining your last name with the assignment number. For example, if your last name is Smith, assignment 2 would be emailed as smith2.pdf. The first assignment is a special case, in which smith1.pdf should be submitted zipped together with a mat file, three txt files and three xls files that are your basic data (see **Notes\_1.pdf**). For succeeding assignments you will email just a pdf file. Graded assignments are returned to you as annotated pdf files with a modified name (e.g., smith2\_graded.pdf)

In each assignment, you run a Matlab script on your data. The script produces one or more figure windows with graphics or text results. Sometimes the assignment requires modifying figure windows, or running the script more than once and including windows from multiple runs. As part of the assignment, you are asked to interpret the information in the figure windows. The procedure for submitting your answers is to (1) get the figure into your word processor, (2) write your answer in a caption to the figure, (3) repeat for all required figures, (4) convert your word processing document to pdf, and (4) email me your pdf file. The pdf file should be composed of only figures with captions. No additional text should be in the document.

The captions to figures should concisely answer questions in the assignment. No caption should exceed 200 words. Typically, the caption will be much shorter. Credit is given only for answering the questions asked -- not for digressing on other topics, even if interesting. Captions should be written using correct English grammar, not in computer code. The style should be similar to what you would use in a figure and caption for a paper submitted to a journal. Typically the first sentence or the caption-title itself will identify the series or data (e.g., Figure 1. Time plot of annual precipitation at Yuma, AZ.)

### 2 Putting a Matlab figure caption into a word processor document

The procedure will vary depending on your operating system and word-processing software. Say Matlab has produced the desired figure in Figure Window 1. For MS Word and Matlab under the Windows operating system:

1. Open an MS word document, preferably full-page view
2. Use top menu: Insert→Text Box→Draw Text Box and draw box where you want the figure to be
3. In Matlab, click on Figure Window 1 to make it the current figure window
4. Resize the figure as needed by tugging on the corners
5. In the Matlab figure-window menu: Edit→Copy Figure
6. In MS Word, click in the text box and Edit→Paste

The above sequence has to be modified for other situations. The only other combination I have used is Matlab running under Ubuntu, with MS Word running under Windows virtually (via Virtual Box). For that case I am not able to copy/paste directly as in steps step 5-6 above. Instead, at the Matlab figure menu choose *File – Save*, then choose *jpeg* (other graphics formats may work, too), then in MS Word *Insert – Picture* and click on the *jpeg* file to put the figure in the text box.

I haven't tried a Mac for this objective, but students have successfully done that in the past. If you have problems, please bring the issue up in class and someone will have a solution.

### **3 Annotating a figure with arrows, text, etc.**

Most of the assignments require you to annotate a plot in some way to illustrate some feature before you copy the figure window to your word processing document. For all annotation except freestyle lines, use the Matlab figure-editing tools. Most useful here is the "Insert" command at the top of the Matlab figure window. There you may add arrows, text and other features.

If you do add annotation, it is a good idea to use "Tools" and "Pin to Axes" from the figure-window menu to make sure that any added arrow, line, etc., does not shift position when you happen to re-size the figure afterward.

Sometimes you might want to annotate a figure with a freestyle line (e.g., to illustrate a "wave" in the data). Because Matlab's figure-editing tool does not have that capability, you may use Acrobat's markup tools for that purpose. Please refrain from using other Acrobat markup tools in the assignments to avoid confusion with my grading markups – which are done with either Acrobat (on Windows) or PDF Studio (on Ubuntu). Use Matlab's editing tools for all other annotation.

### **4 Putting answers to an assignment in a figure caption**

Assignments should have only two elements – figures and captions. The questions asked in the assignment are to be answered in the figure captions. Your word processor will have some way of linking a caption with a figure. Say you've generated a figure in Matlab, added arrows or whatever to highlight some point, and copied the figure to your MS-word document as described in steps 1-6 above. Next you want to add a caption. Continue with the above example. Suppose now you have the figure in a text box in MS Word.

7. Click on the lower handle of the text box and drag it down to open up space for the caption
8. Right click on the figure in the text box to bring up a menu and click "Insert Caption"
9. Click "OK", and enter the desired text

Here's an example of generation of a Matlab figure and its insertion into MS Word. Open a new blank document in MS Word, click **View/One Page** to set the view to "whole page" then click **Insert/TextBox**, and draw a text box to hold a figure. Then switch to Matlab to generate the figure. Give the next two commands:

```
>>x=rand(10,1);  
>>plot(x,'-o')
```

You can use the figure-window annotation features (e.g., arrows and text) to point out items of interest in the figure. The necessary tools for annotation are in the menu at the top of the figure window. I used the tools here to insert a text arrow. The next step is to put the figure into the MS Word document. On the Matlab figure window menu, click Edit/CopyFigure, then inside the box in MS Word click Paste. You now have the figure in a text box in MS Word. Pull down the bottom of the text box to allow room for a caption. Right-click the figure inside the text box to bring up a menu that includes "Caption". Click Caption, and then OK when the figure box comes up with a caption number. Now can enter whatever text you want as the caption (Figure 1).

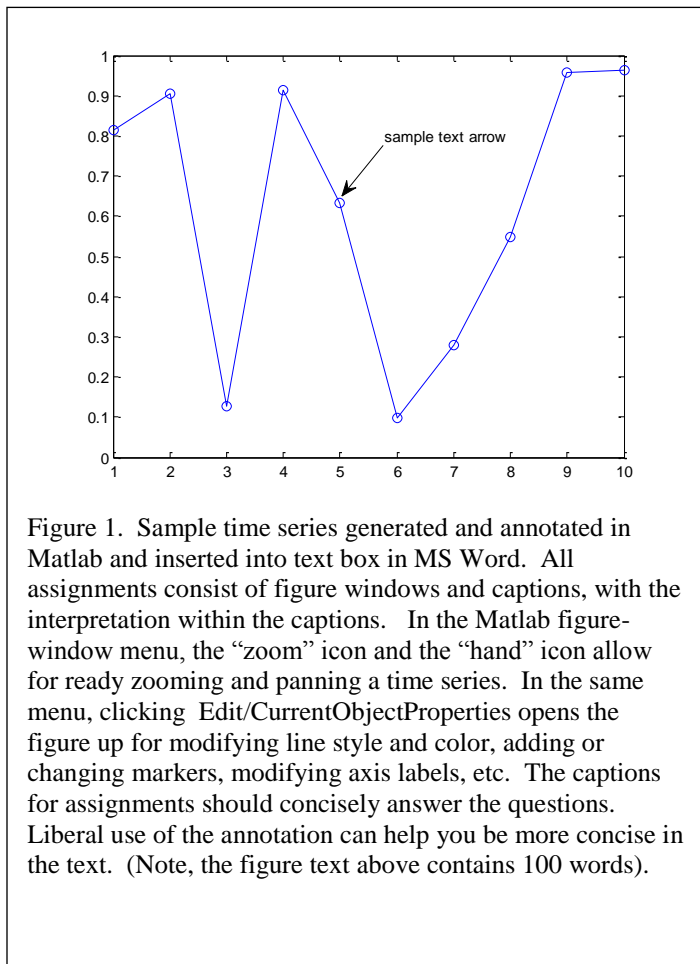


Figure 1. Sample time series generated and annotated in Matlab and inserted into text box in MS Word. All assignments consist of figure windows and captions, with the interpretation within the captions. In the Matlab figure-window menu, the "zoom" icon and the "hand" icon allow for ready zooming and panning a time series. In the same menu, clicking Edit/CurrentObjectProperties opens the figure up for modifying line style and color, adding or changing markers, modifying axis labels, etc. The captions for assignments should concisely answer the questions. Liberal use of the annotation can help you be more concise in the text. (Note, the figure text above contains 100 words).

## 5 Combining two (or more) MATLAB figures in one MS Word text box

Say you want two plots, A and B, to be one above the other in an MS Word text box. You also want a caption in the text box describing A and B, and want the caption to be below the plot B (at the bottom of the text box). Assume in Matlab you have plots A and B in different figure windows, and have used the text tool to label them as “A” and “B”.

1. Draw the text box in MS Word, as described in (2) above
2. As in (2.3) to (2.7) above, insert A into the text box
3. Drag the bottom of the text box if need to make space in the text box below A
4. As in (2.3) to (2.7) above, insert B into the text box, directly below A
5. Right click on B and insert caption

## 6 Extracting data produced by the scripts

Most of the assignments include all needed results in the graphics output. But sometimes you are asked to use some of the data or statistics produced by the scripts. What if you run a script to illustrate filtering and you actually want to save and use the filtered series outside Matlab or in some other MATLAB script? Two ways to do this are 1) using the Workspace window from the desktop and 2) writing some code in the script to export and save data in the desired format. See “Getting Started with Matlab”, from the Matlab help menu, for information on exporting data.

## 7 Zoom and pan on time series

Some assignments ask for zoomed versions of plots, so that detail is more clearly visible. Zooming and panning are convenient for looking at portions of time series. The “hand” signal on the top menu of the Figure Window lets you pan, or shift the series along the time axis. You can readily zoom in on any of the figure windows created by the scripts. This can be done with the zoom tool from the figure window menu. Right clicking with zoom on will let you change the zoom options. The horizontal zoom is most useful for looking at portions of time series while preserving the view of the whole y-axis range. You can also zoom on the current figure window by issuing the following command from the command window:

```
>zoom xon ..... for horizontal zoom  
>zoom on ..... for unrestricted zoom
```

Putting a grid on the figure is also useful for some purposes:

```
>grid on  
>grid off
```

Zoom and grid are toggle commands, so that if the grid is already on and you give the “grid” command, the grid turns off. You will notice that some figures made by the scripts already have grid and/or zoom turned on.