In Class Plotting with Excel; Figures with Word
CM3215 Fundamentals of Chemical Engineering Lab

Michigan Tech
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Department of Chemical Engineering

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Assignment 0:

Part 1: Using Excel, produce Figure 1 and Figure 2 using the data given in Table 1. Import the two figures into a Word document looking exactly as they do here. When you are done, show your results to the instructor for checking (no need to include the captions).

Part 2: Using Excel, produce the three graphs shown in Figures 3, 4, and 5 using the data given in Table 2. Produce the identical trend-line fits. Answer the questions posed in the figure captions. When you are done, write your answers on the page and show your results to the TA or instructor for checking.

Table 1: These are the data for Part 1 and Part 2.
The captions for tables are placed at the top.

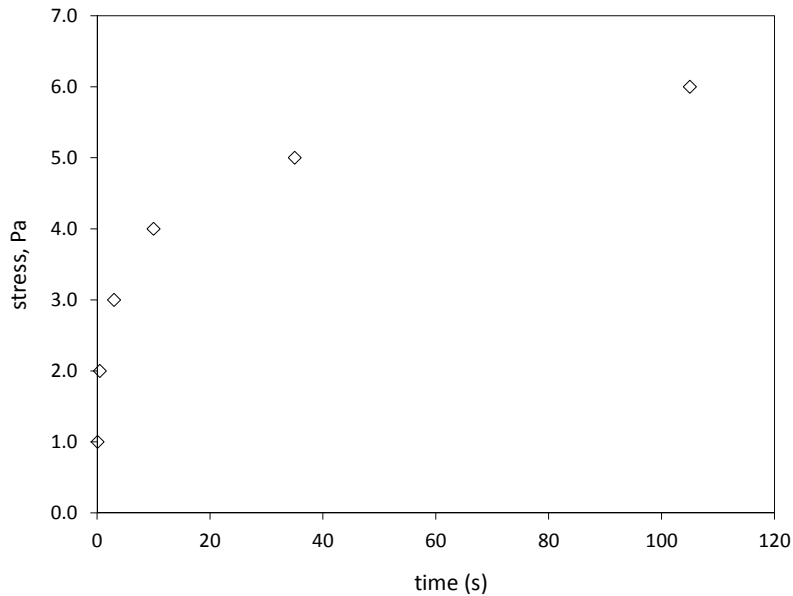| time (s)	stress (Pa)
0.1	1.0E+00
0.5	2.0E+00
3	3.0E+00
10	4.0E+00
35	5.0E+00
105	6.0E+00

Figure 1: In technical report writing, it is important to produce clear, meaningful graphics, such as that shown here. The number of digits in the axis labels reflects the number of significant figures in the numbers plotted. The captions for figures are at the bottom. Note that all lines and fonts must be in true black color in order to print well (the Excel default is a grey that is hard to read when printed). The data axes numbers here are 16pt and the axis labels are 18pt in Excel, but the graph has been reduced in size by 50%; once they are reduced into this Word file, they are a good size for reading. My advice is to save a **Template** in Excel once you have the settings right.
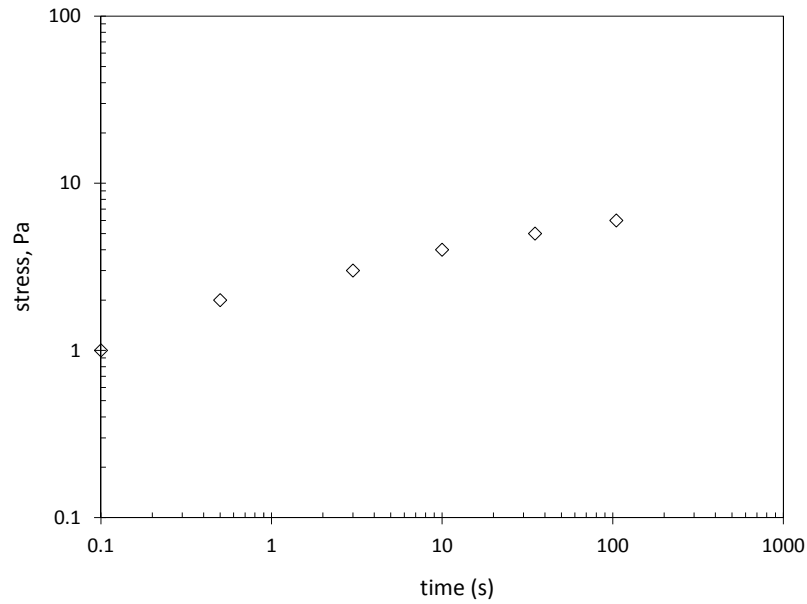
10 January 2016

Figure 2: When data vary greatly over several orders of magnitude, we often use log-log scaling on the axes to better display the trends in the data. The data have not changed values; the axes have been compressed. Minor tic marks are desirable on log-scaled axes. The Excel number format **General** is best on log-scaled axes.
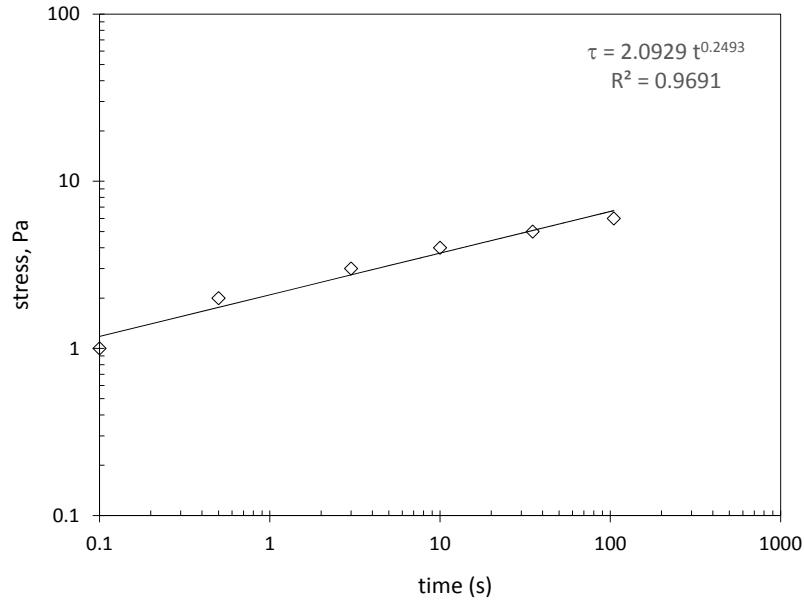
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Figure 3: In this first plot of Part 2, the trendline feature of Excel is used to fit a power law empirical model to the supplied data. In the power-law equation $\tau = At^n$, A is the prefactor and n is the power-law exponent. Hint: use *Symbol* font to get the τ.
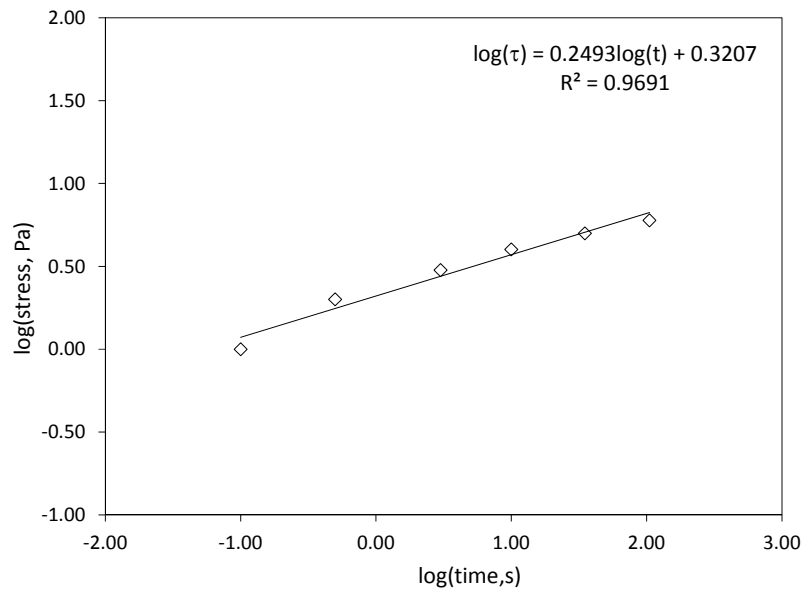

Figure 4: In the second graph of Part 2, the same data are plotted, but first we take the log of both the x-data and the y-data and plot linear-linear. To get the same trendline fit, we now choose a linear function. How are the slope and intercept here related to the prefactor and power-law exponent in Figure 3? Write your answer down and show to the TA or instructor.
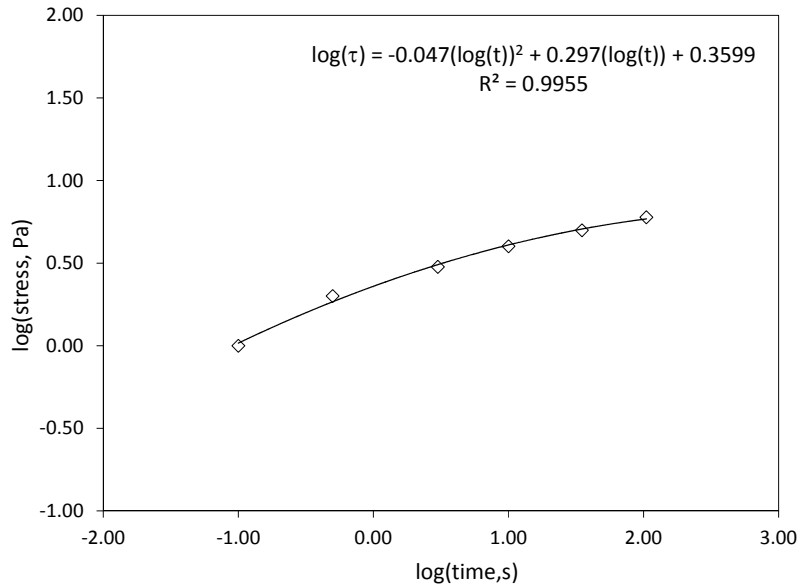
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Figure 5: In the third graph of Part 2, we improve the fit to the data by using a polynomial of order 2. Note that we could not get this polynomial fit while using the log scaling of the axes. It is only possible when we take the log of both x and y data and plot linear-linear. We need a good fit like this if we wish to use the model to interpolate between the data points.   What is a good estimate of the stress at time 1.5 seconds? Show your answer to the TA or instructor.
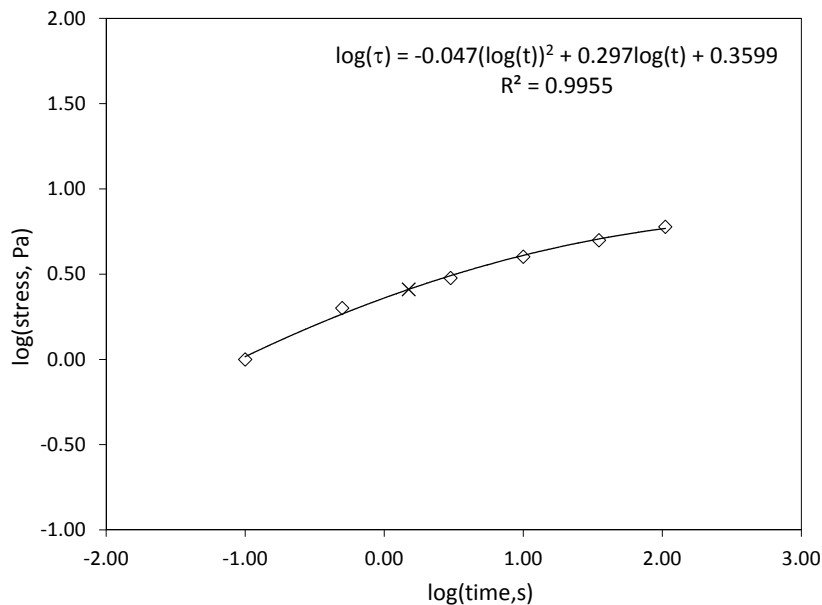

Figure 6: This is a stretch graph (not required); the point at time 1.5 seconds is shown. We have included additional significant figures on the axes of Figures 5 and 6 so that returning to regular scaling may be done accurately.

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