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Octave Tutorial Tutorial video, Tutorial PDF

This project required me to research different tutorials about octave or MATLAB. During my research I first arrived on a YouTube video that gave me the basic understanding of Octave. This tutorial taught me how to shorthand on the command window and gave me a generic rundown of the whole program. This video first started with an introduction into the MATLAB GUI and gave me a basic idea for how stored variables work inside of the IDE. There was lots of helpful information throughout this whole tutorial showing us basic things that are unique to MATLAB and Octave. These features include not having to import any math libraries to use math features like pi and sin, as well as the plot feature which allows us to plot any function very quickly. Although this tutorial was over an hour long and covered many important topics, it failed to give a concrete example on plotting, so I researched for another tutorial.

The next tutorial I found was a pdf that included many plotting examples and two exercises for me to do. This tutorial first started out by walking me through on how to correctly plot a function. The first function they covered was line spacing which is used to determine the interval for which you would like to plot your graph on. It then covers the different variables you can include in your plot method to change the out-put of your plot. This includes changing the color, the line width, and the line itself (dashed or not dashed). If we run the script using the function plot (x, y,'r—*','linewidth','3'), we are presented with figure 1 graph which is shown below.

Next the tutorial wants us to do the two exercises which are similar, but different in difficulty. The first exercise wants us to plot the function f(x)=e^{-x^2} on the interval $0 \leq x \leq 1$. To start this exercise, we first create our interval using the interval feature in octave, which looks like this, x = (0:0.05:1), this will give us our graph on the interval 0,1 iterating a point every 0.05. Next, we want to solve our y values which we can do with just some simple arithmetic, setting y = exp (x^2). Now that we have our x values and our y values, we can now graph the function using the plot function. The problem tells us that we need to have a solid red line and default thickness, so our plot function would look like this, plot (x, y,'b—*','linewidth','3'). The exercise then wants us to title our graph and turn the grid on, we can do this by simple just writing grid on and title("Gaussian"). When we run this script, we get figure 2 below. I find it interesting how easily octave handles arithmetic compared to Java. In Java to compute the function f(x)=e^{-x^2} we would need to import several math libraries and create several lines of code, but in octave it can all be handled in one line.

The next excise is similar to exercise one, but slightly more challenging. In this exercise we have to graph two function f(x)= sin $(2\pi x)$, and f(x)= cos $(2\pi x)$. To start this problem, we first must set our intervals for our x values, once again our intervals are $0 \leq x \leq 1$, which means we can just reuse our code above and set x = (0:0.025:1). Now that we have our x values, we can solve for our y values by plugging in and solving using the formula sin $(2\pi x)$. Now that we have our x and y values we can plot our function, but first we must declare our subplot. A subplot allows us to cleanly and easily plot multiple graphs on the same figure. To do this we just call the subplot function and set our parameters to what we need. This would look like this Subplot (221), the first two numbers in the parameters are our subplot matrix size, so here it would be a 2 by 2 matrix. The last number in the parameters is the location of the graph in the matrix. Once we have our subplot declared we can then plot our function, the problem wants us to graph it with a black dash line with o for the points, this would look like plot(x,y,'k—o','linewidht',1). We then must give our graph a title as well as label our x and y axis. This graph result is shown in figure 3 below. The next part of the exercise wants us to graph the function f(x)=cos $(2\pi x)$. This part is almost identical to the above part, but some things are just a little bit different. Once we have solved for our new y values, we then must graph our new function. To do this we first want to call our subplot from above but change it so the graph is located at the correct index in our matrix, this would look like this subplot (222). Finally, we can then plot our function, which according to the problem requires a blacked dashed line with o's for the plotting points. After we plot the function, we need to give it a tittle and label our x and y axis. The result for this graph is given below (figure 3).

Figure 1

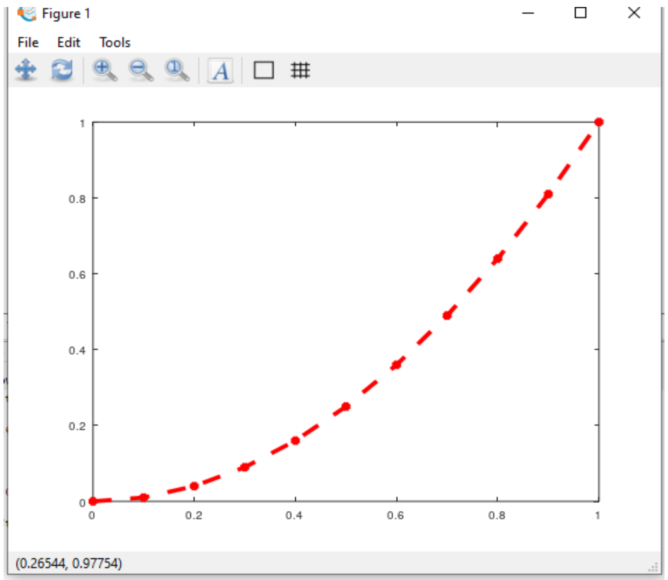

Figure 2

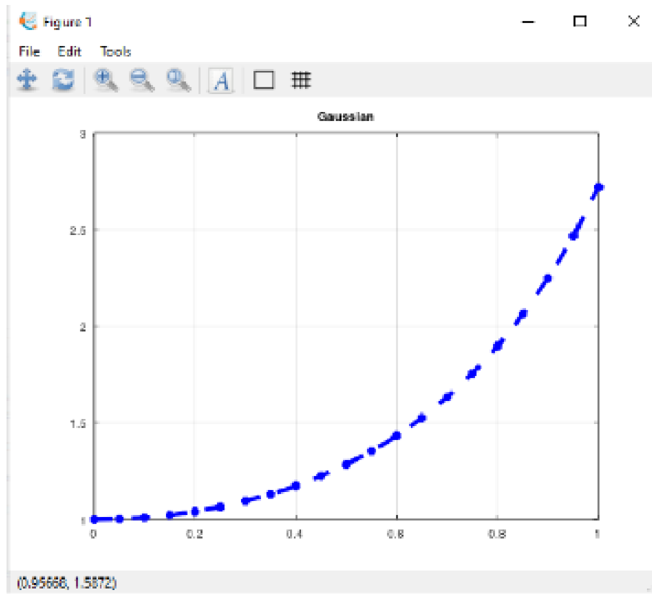

Figure 3