**Phase field modeling;**
**the materials science,**
**mathematics and**
**computational aspects**

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**Module No.5**
**Lecture No.24**
**GNU Octave:**
**script mode**

Welcome we are working with octave we are trying to do some computations and plotting with octave this is the introductory session two octave and then we will start using it for our purposes to understand face will modeling one of the things that I have shown you is how to do calculations with octave the other thing to do is to plot using out there and of course for doing both.

I have also shown you how to take help from our octave itself and how some of that information is actually more than just help in working with octave you can actually tell you lots of other useful information in terms of mathematics algorithms programming and so on okay so the way that I have been interacting with octave is what is known as the interactive mode in which I type something on the terminal and then octave immediately responds to it

But this is not the best way of dealing with octave because sometimes we want to give a set of commands we want octave to execute all of it we do not want to know in the middle as to what is happening or at every step octave of telling us what is happening for doing that there is the so

called the script mode of interacting with octave in script mode we basically take a text file and in the text file we type all the commands that we want octave to execute we save that text file in
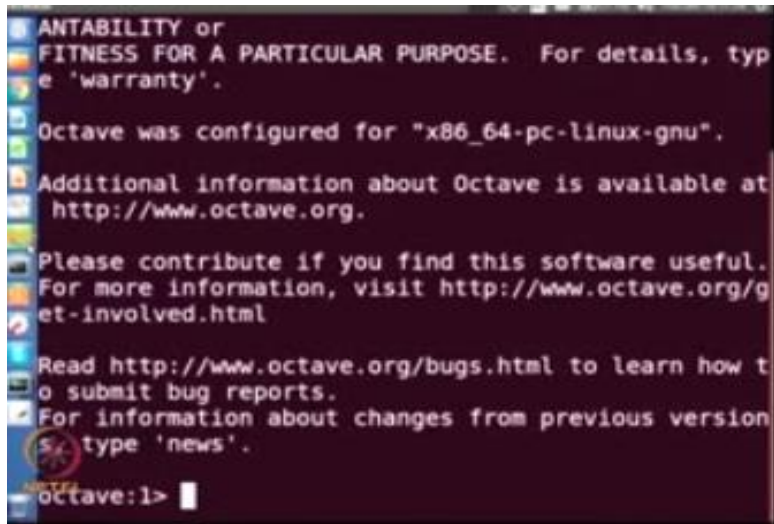
The same directory from which you are going to invoke okay this requires some explanation I will actually show you how it works and that is where invoking octave from the terminal is a very good idea because you can do that to quite comfortably and then we are going to execute the script that we have written the script is going to be very simple it is a two lines script it is going to plot the sine function from 0 to 2 pi okay so that is what we want to do first I will show you in the interactive mode how to do that and then we will go to doing it in the script mode of course.

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First thing let me.

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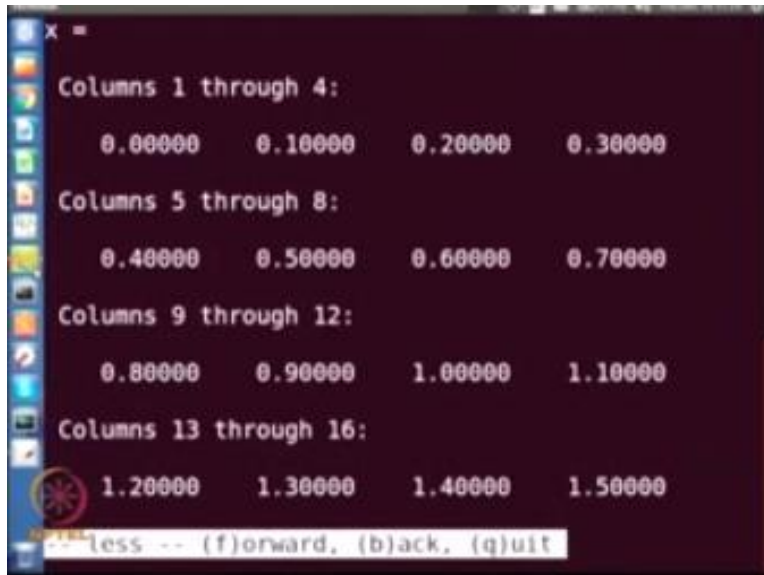


Invoke octave so I have octave I am going to say x is equal to 0 to let me increase in steps of point 1 2 pi right so 2 into pi is 2 pi very good.
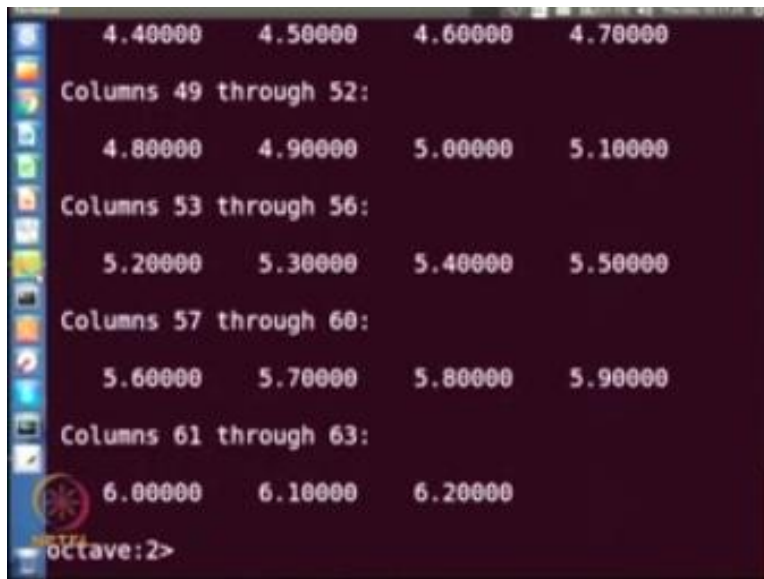
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If I do that you can see it goes from zero point 1 point 2 etcetera.

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```
    4.40000    4.50000    4.60000    4.70000
Columns 49 through 52:
    4.80000    4.90000    5.00000    5.10000
Columns 53 through 56:
    5.20000    5.30000    5.40000    5.50000
Columns 57 through 60:
    5.60000    5.70000    5.80000    5.90000
Columns 61 through 63:
    6.00000    6.10000    6.20000
octave:2>
```
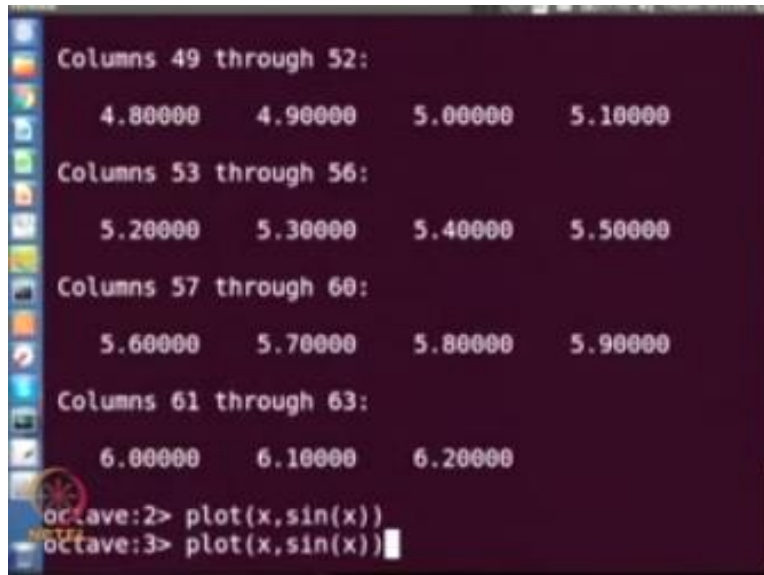
It goes up to six point two because pi is 3.14 and 2pi is 2 into 3.14 so it is about 6.2 this is right then I say plot x sine.

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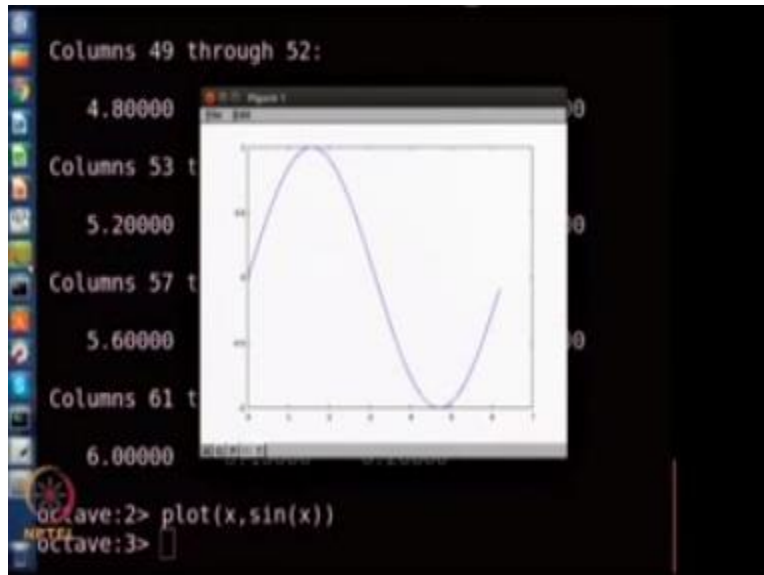


X right I have a plot this is a sine function which is plotted of course we can plot any function.
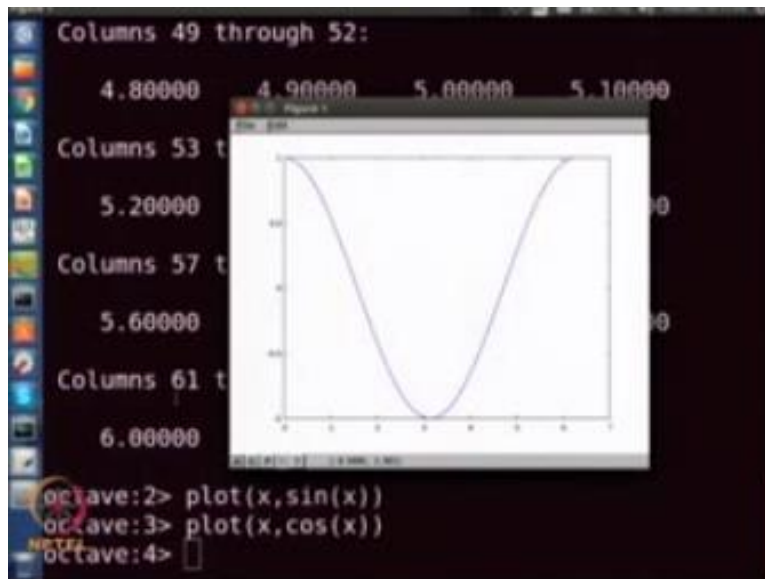
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```
Columns 49 through 52:

    4.80000    4.90000    5.00000    5.10000

Columns 53 through 56:

    5.20000    5.30000    5.40000    5.50000

Columns 57 through 60:

    5.60000    5.70000    5.80000    5.90000

Columns 61 through 63:

    6.00000    6.10000    6.20000

octave:2> plot(x,sin(x))
octave:3> plot(x,sin(x))
```

So you can say x cos it will plot you the Cos x.

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Right and you can say plot x annex.

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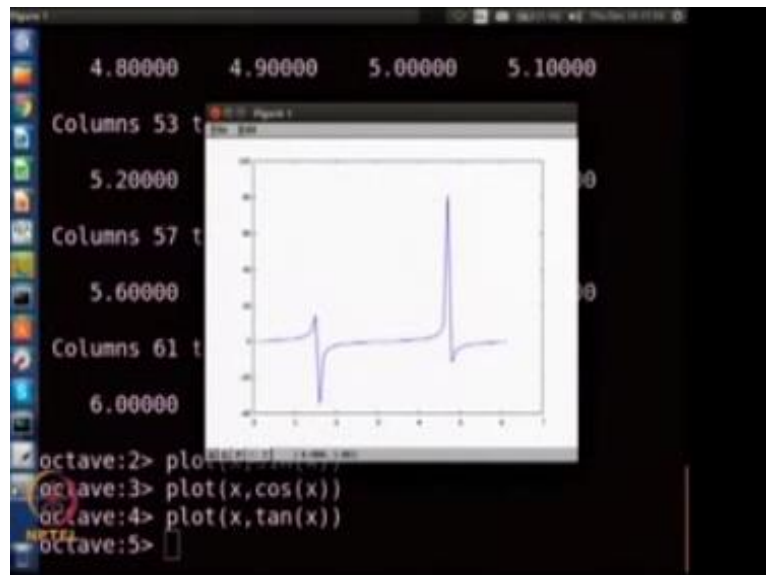


And it will plot you tan x okay so it is possible to plot any of these functions so the exercise that we have now is to do this plotting using script mode okay so I am going to show you from the beginning how to do it in the script mode because this is slightly involved if you are using mat lab there are some advantages that you would see that.
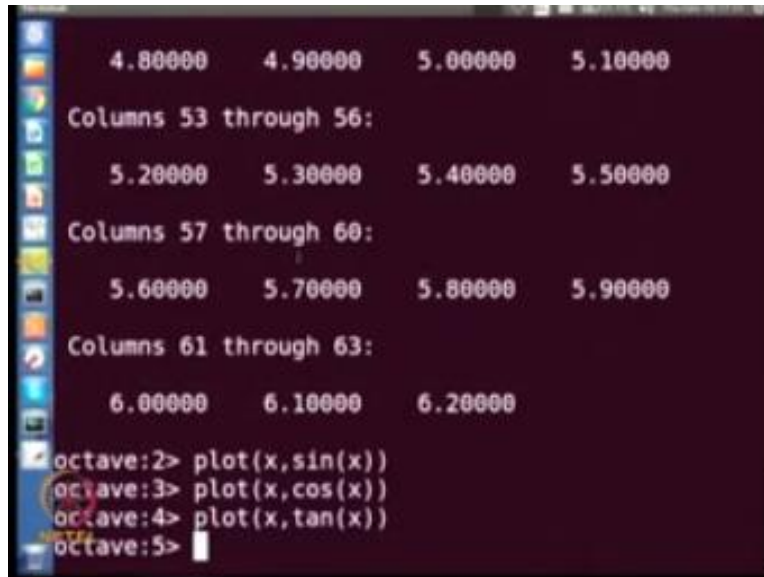
For example you can write the script by having drop-down menu from which you can choose and you can just write the script there but when you are using octave you have to use text editor and that text editor should be a simple text editor G edit or notepad is very good you cannot use things like a word or office or something like that because if there are hidden characters then octave has problems in dealing with it so a simple text editor is what we'll do the job for you and I generally use a text editor called G edit which again is free and you can download and load it onto your computer so we are going to do it insteps or so.

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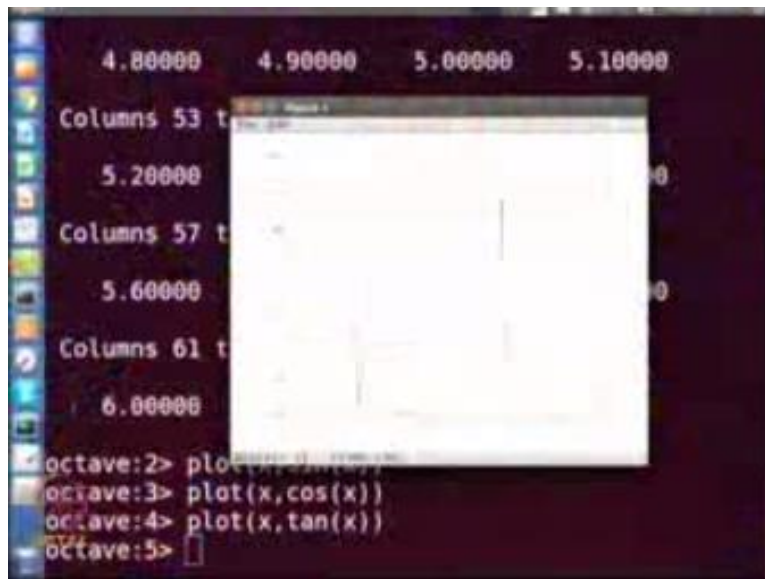


I'm going to start from the beginning.
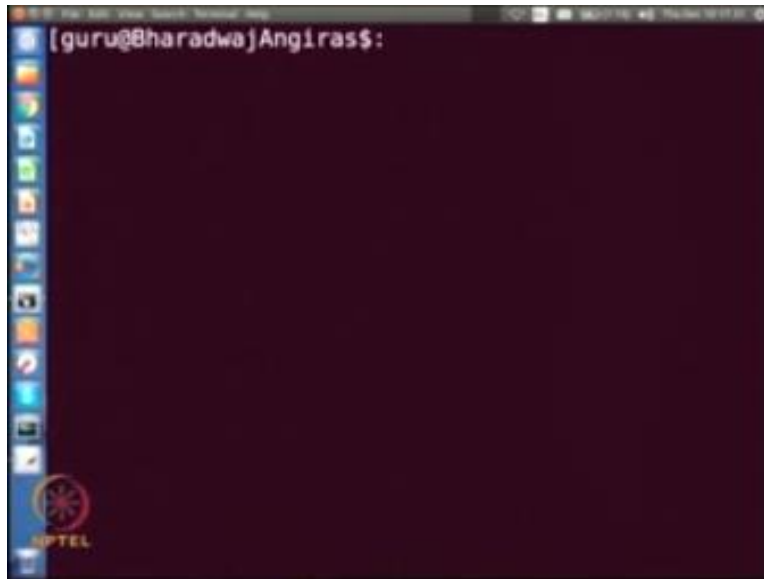
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So let us exit all this.
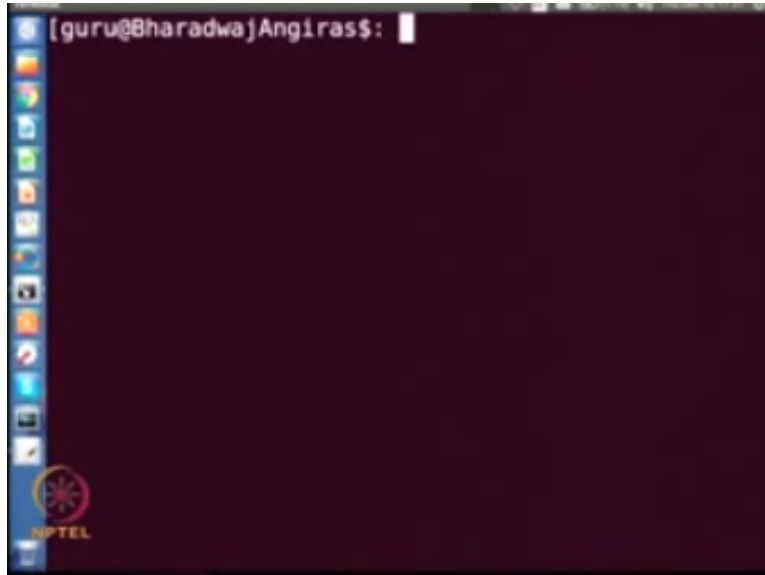
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First thing I am going to do is that I am going to.

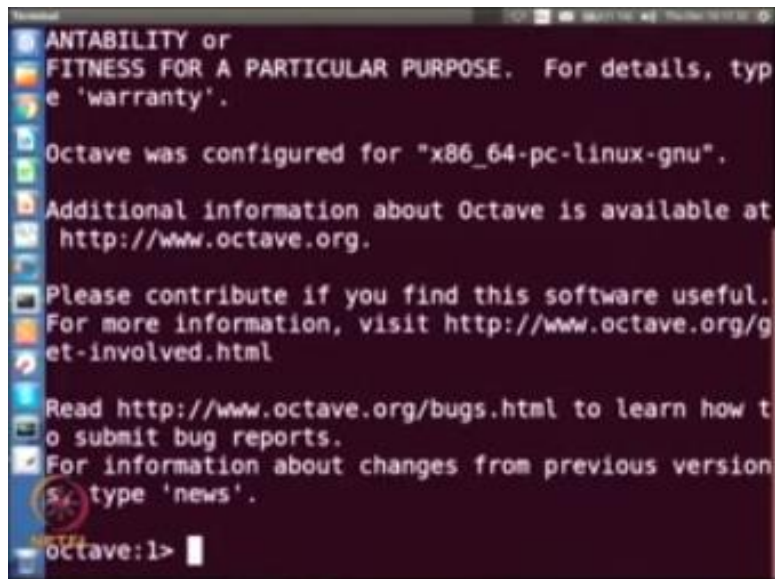(Refer Slide Time: 04:51)



Open the terminal in.

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My computer I have a specific directory structure so on the desktop there is a directory called teaching in which there is a directory called the phase field move okay there is nothing in that directory as of now this is the directory in which I want to save my scripts and that is the script I want to run so the first thing that I need to do is to actually go to this directory which is what I have done c d stands for change directory in Ubuntu so I if I ask what is the present working directory PWD it says it is in home guru desktop teaching phase field move that is where I am now I am going to invoke octave from this directory.

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This step is very important because if you do not do this if you just invoke octave from one directory and if your script is lying somewhere else then octave will keep complaining that there is no such file okay so the first thing that you do is you go to the directory in which you are going to save your script and the invoke octave from that particular directory this is the first important step after have done this let me.
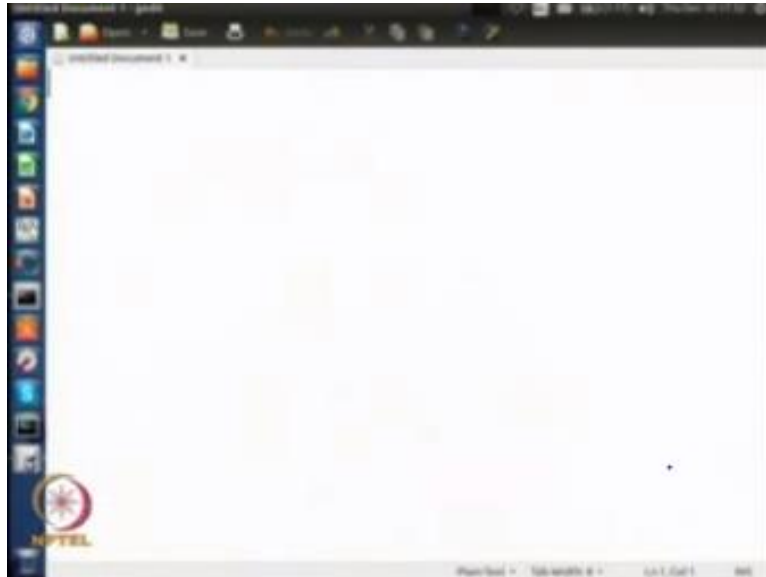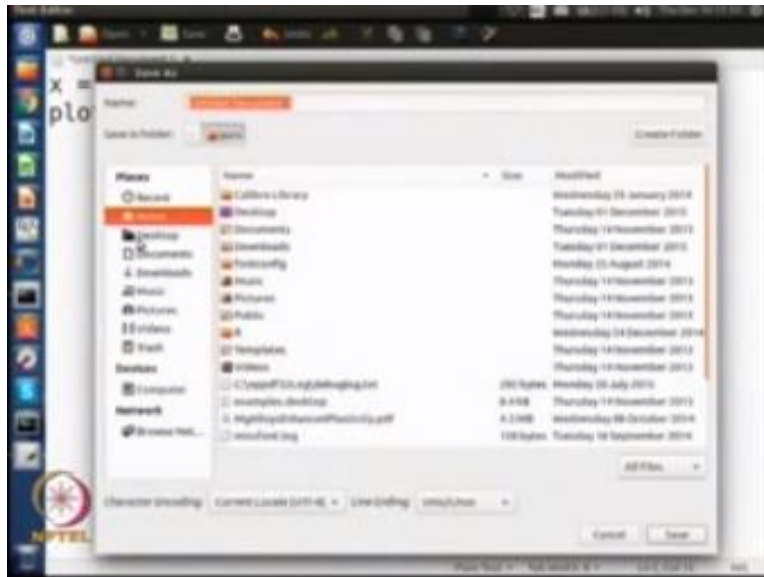
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Open a text editor so I have a text editor called.

The G edit and it has an untitled document in which I am going to type whatever I typed on the screen first step is X is equal to 0 in steps of point 1 2 into pi of course I do not want things to be printed to the screen so I am going to put a colon here and then I am going to say plot x comma sine of X right so I am going to save.

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Where am I going to save going to save it as desktop teaching and the face will look.

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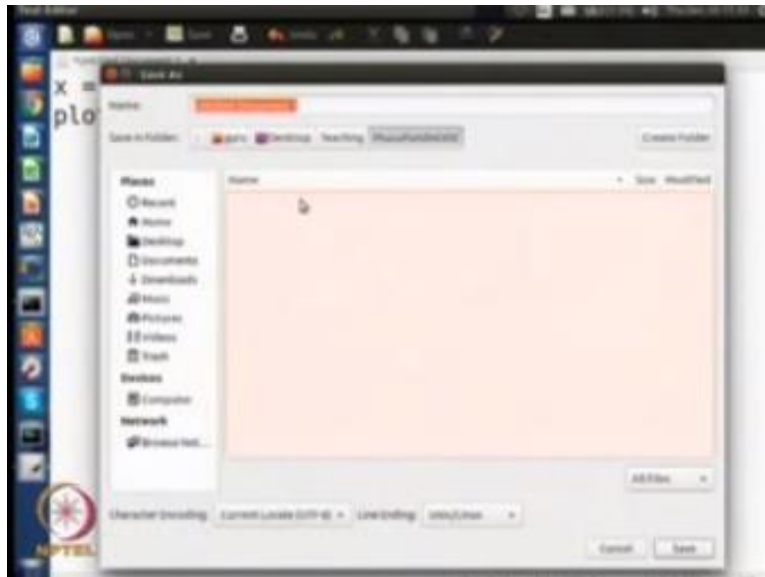


And I am going to save it just to say that this is an octave file I am going to give an extension called OCT and I am going to save this as flawed thing let me floating sine dot 0CT okay.

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So this is very, very important I cannot call this file as plot dot Oct because plot is a command that is in octave so no filename can have the same name I cannot call this as sine dot Oct because sine is again a specific command in octave so no function names are any of these command names can be used as the file name for this file that you are saving okay so this is one of the mistakes that happen at the beginning and if you make such a file even if you delete it octave will somehow remember that you have made a file called the plot or sign and it will keep complaining.
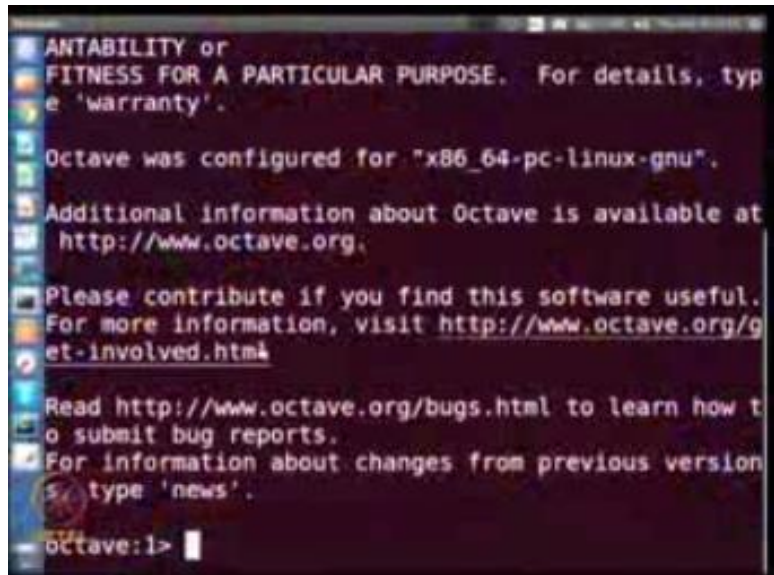
So the only way I found these two exit octave and then again invoke octave and then work with it so in the directory in which you are invoking octave from there should not be any files which are named after the commands or function calls of octave so it is very important so that is why.

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I have named it as plotting sign and in general again Line x machines the capitals and the small letters are distinguished so I used to capital P and capital s I need to remember that so in octave now.

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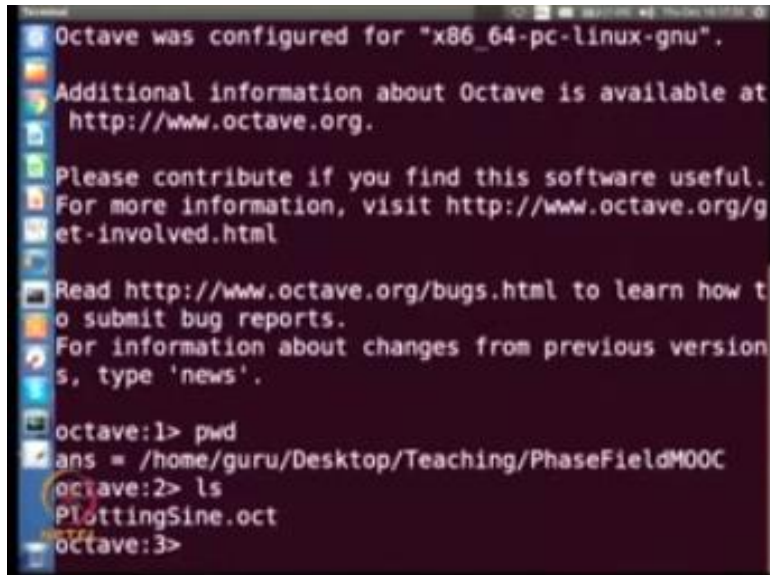


I can check if I am in the right directory so yes I am in the right directory so present working directory works here also I want to know what are the files in this directory I can ask if the list so list.
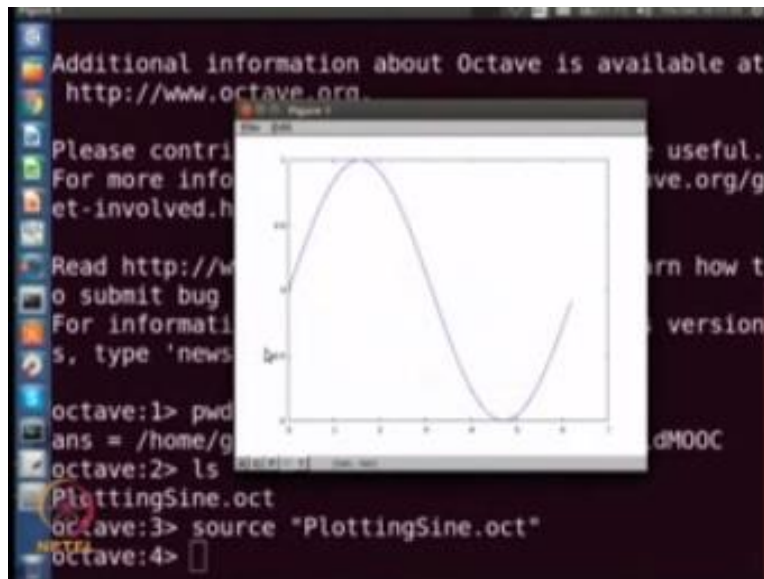
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Will say okay that is a file called plotting sign now I want octave to run this file and show me the sine curve right how do I do that I say source right and then you give the name of the file.
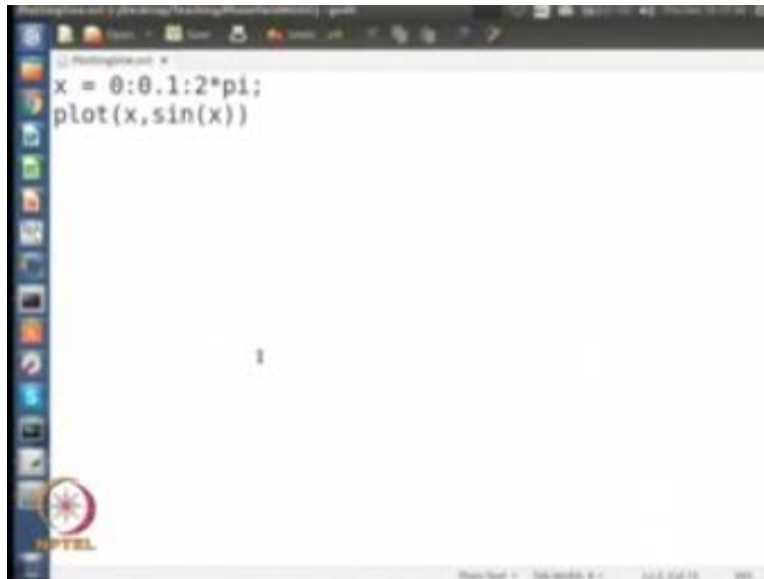
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Then plotted and so did Utley so this way of interacting with octave is the preferred mode at least in this course we will prefer this because many a times we want to do some computation and then we want to generate some results and then we wanted to be plotted so we do not want to continuously keep interacting with outfit I do not want to give one command by one command I do not want to say okay x is this and then it says okay I have taken then I say okay plot this and then it is and then I say okay do this computation.

And then it does that and the computation itself might be four or five lines like we were struggling with the error calculation for the Sterling approximation for example so I do not want to do that  I want to write all my commands in one go and then I wanted to execute so I am going to show one final trick for this lecture this is to plot more than one curve in the same plot right I have plotted sign suppose I want to plot both the sine and cosine in the same curve how do I do that so I am going to take the script file I'm going to modify it a little bit and then I am going to plot it and show it to you.
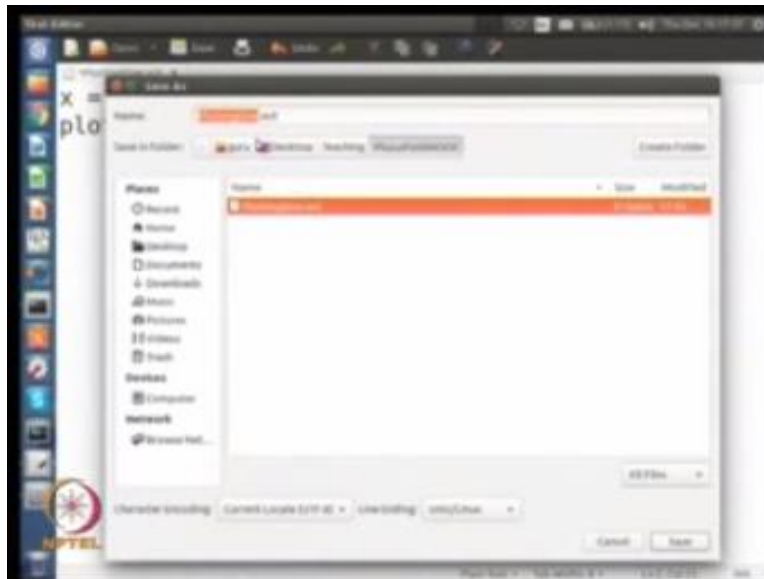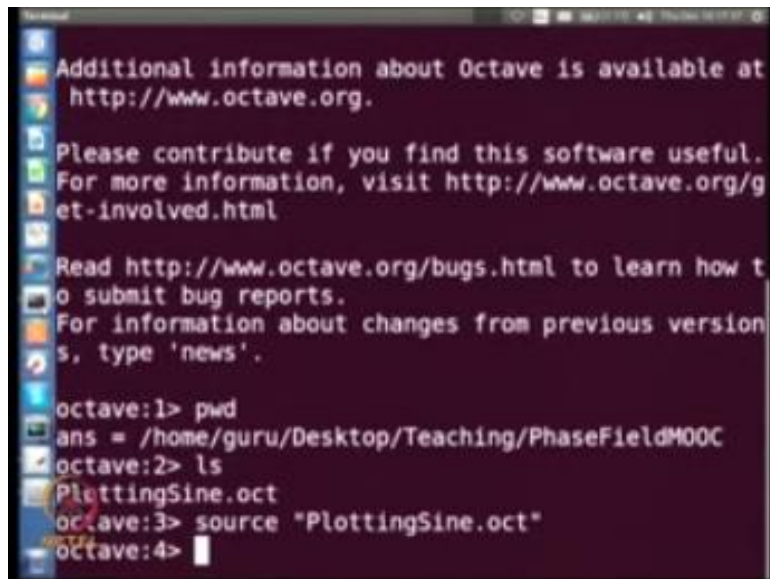
So let us do that so I have the file very trivial oh my x comma cos of X and then I'm going to save it as a different file.

Plotting sin and cos okay so let me call that as floating sine and cos da city and go back.

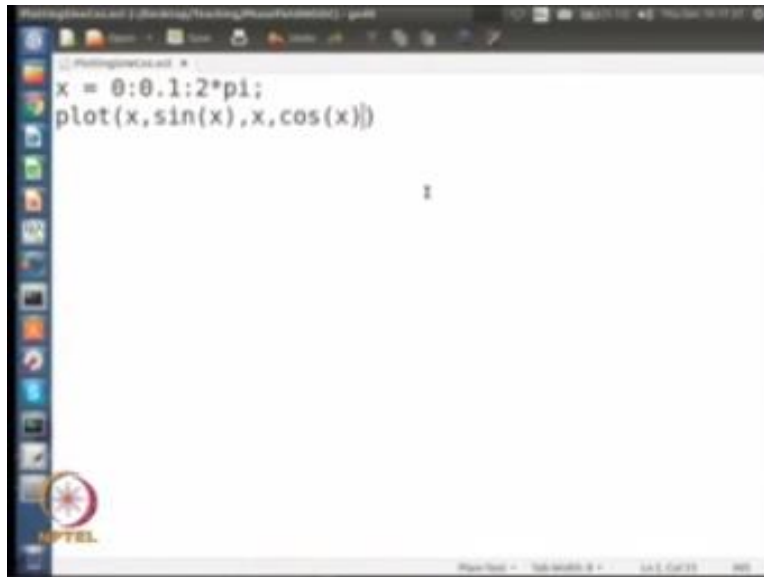(Refer Slide Time: 10:42)



And then of course rotting sine cos act say a food plot both.

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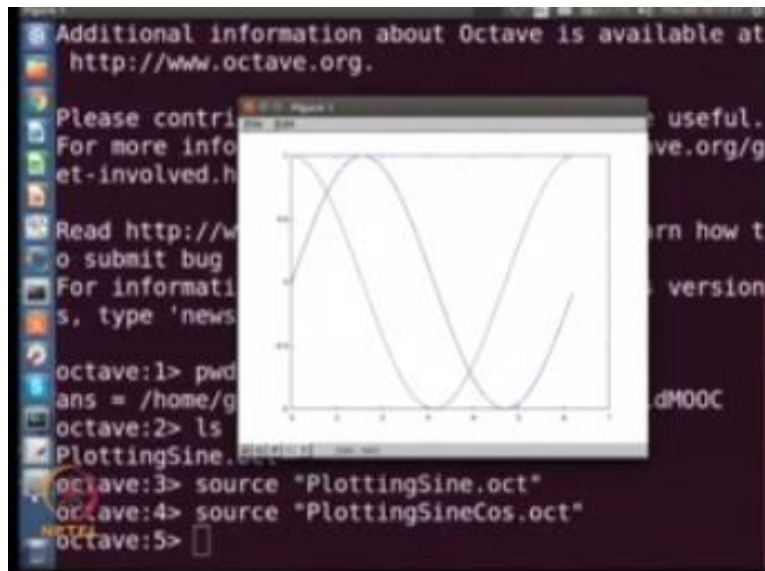


Sin and cos I do not know if it is clear to you on the screen but the cosine is plotted with green color and the sign is plotted with the blue color so by default it will pot it with two different colors so that you can distinguish which plot is what suppose I wanted to plot.
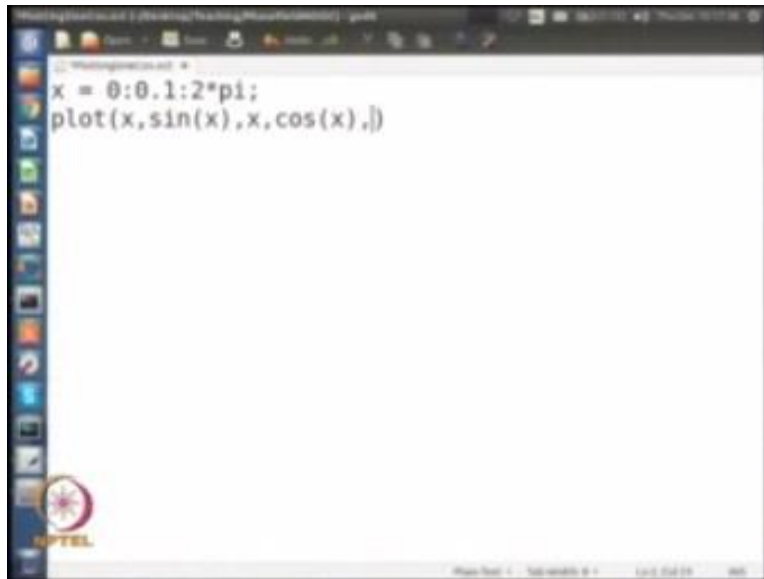
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The cosine with points and not with line as it has plotted you can do that and here is how you do it you go to the.

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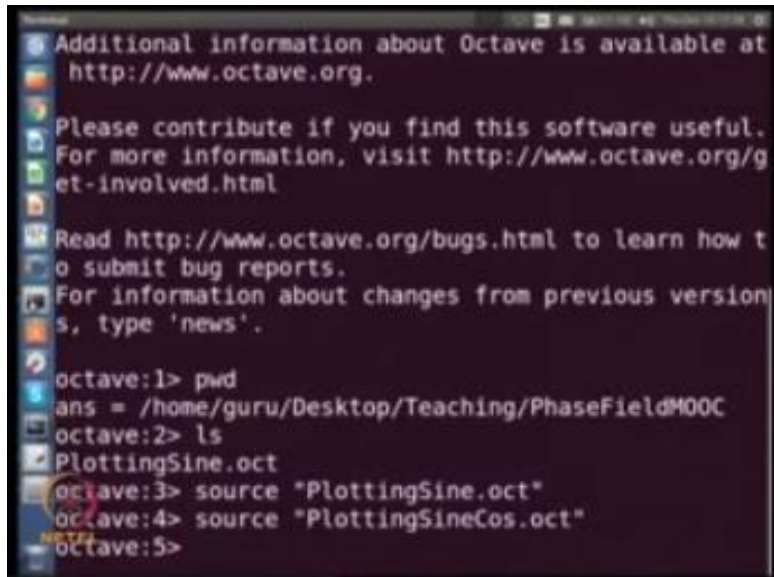The script you change that you say that the plotted bit points ok so let us say this and let us go to octave.

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And let us redo this let us see how the picture looks like.

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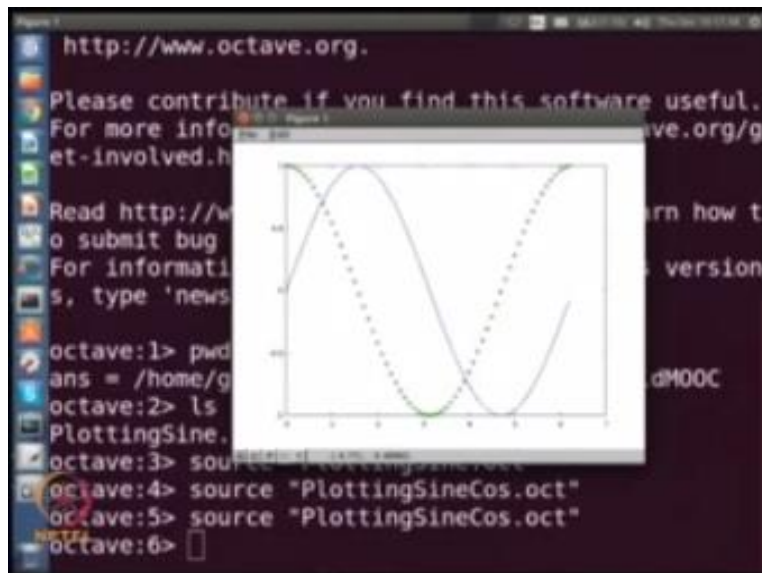


So you can see that now the cosine is plotted but the cosine is plotted with some stars ok i do not know if you can  see the stars but that is the stars that it has used so there are ways of controlling the color the symbol the way the plot is made and so on and so forth so those are all available in the tutorial that we have written to process up on nv and it is available for you for download you can download and work with that but for our purposes this is sufficient.

So if you have some practice with these things we will give you some tutorial problems for you to work with which will make you familiar with this kind of calculations and plotting then that is sufficient for our purposes so that we can move on to doing actual calculations for the course on facial modeling using object which is what we will start doing from the next lecture onwards thank you.

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