

ME 201/MTH 281

USING MATHEMATICA IN THE ME DEPARTMENT COMPUTER LABS

Updated September 7, 2009

GENERAL INFORMATION ABOUT THE COMPUTER LABS

The ME Department Computer Labs are in Rooms 05 and 06 in the basement of the Hopeman Building. The original labs were made possible by grants from NSF and from General Motors. Subsequent upgrades to the lab have been made possible by funding from the Department of Mechanical Engineering, from the College Deans' Office, and from IBM.

There are 16 PC's and a laser printer in Room 05, and 10 PC's and a laser printer in Room 06. All the PC's run Windows XP. Mathematica is the principal software tool in this course, and Version 7.0.1 is installed on all of the machines (see below for a discussion of Mathematica versions). Other software installed on the machines includes Matlab, Microsoft Office, Internet Explorer, and Adobe Acrobat Reader. At present we have licenses for up to 15 concurrent users of Mathematica. If this proves to be too restrictive, we can increase that number on short notice. It is important that you let me know if you have trouble getting access to Mathematica in the lab.

Any software or hardware problems in the lab should be reported either to me (clark@me.rochester.edu) or to the lab director, Prof. Sheryl Gracewski (grace@me.rochester.edu).

ACCESS TO LAB AND MACHINES

The labs will be available whenever the Hopeman Building basement is open. During weekdays, the entire building is open. In the evening and on weekends, only the door nearest Gavett is open (this door gives direct access to the basement door). The hours when this door is open are Monday through Thursday from 630 AM until 1100 PM, Friday from 630 AM until 600 PM, Saturday from 1130 AM until 6 PM, and Sunday from 1130 AM until 1000 PM.

Access to the lab is by a keypad combination lock. The combination will be given out in class. Any changes to the combination during the semester also will be given out in class. To use any of the PC's, you will need to login (unless the previous user has not logged out). The login name is student and the login password is MechE (both case sensitive).

MATHEMATICA VERSIONS

The newest version of Mathematica is version 7, and the latest release is 7.0.1. This is the version which will be used for all course materials in Mathematica (examples and homework solutions). It is strongly recommended that you use version 7 in your work in the course. However, there were very few changes in the user interface between versions 6 and 7, so it would be possible to use version 6. You should not attempt to use the earlier version 5, unless you are prepared to spend lots of time dealing with the many small incompatibilities between version 5 and later versions.

DOWNLOADING COURSE FILES FROM THE INTERNET

All documents relevant to the course are posted on the course web site. The URL is <http://www.me.rochester.edu/courses/ME201>. The linked pages there will direct you to various items such as homework assignments, homework solutions, examples in the form of Mathematica notebooks, and examples in the form of movies. Many of the documents are in Adobe pdf. When you click on such a document, your browser should automatically open Adobe Acrobat Reader, and display the file on your screen. At this point you can scroll through it on the screen, or print it out for reference. If you click on a Mathematica notebook, there are two possible responses, depending on how your browser is configured and whether you have Mathematica on your machine. Either the notebook will be downloaded to your desktop, or your browser will open Mathematica and download the notebook into Mathematica. All of the browsers in the ME Computing Lab will give you a dialogue box asking you which of these options you want.

SAVING YOUR FILES

When you open the **File** menu in Mathematica, two of the options you will see are **Save** and **Save As**. The first one saves the file under its present name and in the location from which it came. If an older version of the file already exists, the **Save** command will overwrite it. If you use **Save As**, you will be presented with a dialogue box which will let you choose the name of the file and the location to which it is to be saved. **If you want your file to survive after you finish your computing for the day, it is crucial that you save it on your own disk or memory stick, because user files are frequently removed from the hard disks of the lab machines.** All of the machines have CD drives and USB ports, and some of the machines have floppy drives. A USB memory stick is probably the most convenient way to save your work.

GETTING HELP WITH MATHEMATICA

There are several sources of help for your work with Mathematica. For a hands-on introduction, there are two notebooks online for beginners with Mathematica. You may access them and download them by clicking on the link Lab and Software on the first page of the course web site. The notebook Sampler is a very brief introduction to basic Mathematica. The file Tutorial is much longer, and is organized by topics. The topics covered in Tutorial include the following: arithmetic; algebra; defining constants, expressions, and functions; plotting; root finding; replacement rules; differentiation; integration; differential equations; summing series; lists and matrices; fitting curves to data; programming in Mathematica; graph animation; and writing your own notebook. Each executable line in Sampler or Tutorial is in blue. To execute any particular line, move your cursor to that line using the mouse, and then click to position the cursor in that line. Then hit **Enter** (or **Shift-Return**) and Mathematica will execute the line for you. Continue through the notebook in this way.

While you are using Mathematica, you can access information about Mathematica functions from the Help menu. This process is described in more detail in Tutorial.

Wolfram has made available a screencast illustrating the basics of Mathematica 7. The URL is <http://url.wolfram.com/6h9HNy/>. This is worth watching. Although the narrator invites you to type along with him, I recommend that you just watch it. I have put a link to the screencast on our course web site. Additional online resources for learning Mathematica are available from Wolfram at <http://url.wolfram.com/6Jt4ni/>.

There are many books on Mathematica. No books yet have been released on Mathematica 7, but the differences in the user interface between versions 6 and 7 are so small that any book on version 6 is useful for version 7. Some references for Mathematica are described in the course handout and in the Mathematica tutorial. Some of them are available on reserve in Carlson.

I can also provide help with Mathematica. I will be available during my office hours, and frequently at other times. There is a phone in the lab, so that you can call me at x54078 if you are having trouble. A better alternative is to bring your memory stick or printout to my office for debugging help. The TA's can also provide you with Mathematica help, as they all used it throughout the course last year.

OTHER SOURCES OF MATHEMATICA

According to ITS, Mathematica is installed on all of the PC's in its laboratories, so there are many other machines with Mathematica on campus, in addition to the 26 in the ME Department Labs. Please forward to me any relevant information you find about the availability of Mathematica on campus.

If you want the convenience of running Mathematica on your own machine, there are a few basics you should know. It runs under Windows, Mac OS X, and Linux. It requires a fairly fast machine and at least 512 M of ram (a Gig or more is much better). **I am happy to report that thanks to the support of Deans Clark and Lennie, and thanks to the hard work of the UR's site licensing group, Mathematica is now available to all students at no cost. The download procedure requires a NetID login. To obtain Mathematica under this license, go to the URL <http://www.rochester.edu/it/downloads/math>.**

SOME RULES FOR USE OF THE ME COMPUTER LABS

To keep the computer lab in good working order and to make resources maximally available, you are asked to observe the rules listed here for the lab.

No food or beverages are allowed in the lab.

No software is to be installed on any machines in the lab. If you have suggestions for software to be installed, send them either to me (clark@me.rochester.edu) or to the ME Computing Lab Director, Prof. Sheryl Gracewski (grace@me.rochester.edu).

No user produced files are to be left on the hard disk at the end of a session.

Priority is given to students doing work in ME courses. Technical work for other courses, or career-related personal work such as resume preparation is permitted whenever there are free machines.

The School of Engineering has specific policies on computer use, all of which apply to users of the ME Department Computer Labs. You should take the time to become familiar with these policies which are online at www.seas.rochester.edu/CNG/docs/policy.html.

IF YOU ARE THE LAST PERSON TO LEAVE THE LAB, PLEASE MAKE SURE THAT THE LAB DOOR IS CLOSED AND LOCKED.