Introduction to Maple Versions 7 to 15

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Multivariate Mathematics with Maple by James A. Carlson and Jennifer M. Johnson, copyright 1996
Introduction to Maple V.4 in the Undergraduate Computer Lab by James A. Carlson and Jennifer M. Johnson, 1993
Math 2250 Maple Tutorial by Nick Korevaar
Math 2250, 2270, 2280 Maple Tutorial by Grant Gustafson, 2012

What is Maple?

Maple is a software package called a **computer algebra system**. It does symbolic computations, such as derivatives and integrals. In addition, it is a **numerical laboratory**, suited for numerical computation, simulations, and what-if experiments in science and engineering.

The graphics features of Maple are useful for geometrical visualization of ideas, understanding definitions and exploring techniques. Use the graphical interface to develop your intuition while learning new topics.

The Math Center Lab
Before you start learning Maple, it is helpful to familiarize yourself with the facilities in the computer lab in the T. Benny Rushing Mathematics Student Center. Please ask in the Math Center for a printed copy of the document

Introduction to the Computer Lab

Campus departments with computer facilities have installed maple under a campus-wide site license. It may be convenient to do xmaple sessions in your own department, or 24/7 from home with maple, a non-graphical interface running in an xterm window.

Starting Maple

Unix Terminal Instructions.
If you are using a UNIX station in our lab, either move the cursor into the local window and type xmaple &, use the middle mouse button on the background to get a menu from which you can select X Maple V12 (or another version), or click on the maple leaf icon at the bottom of the screen. Soon a new window will appear. Click and hold the mouse, then move the window. When satisfied, release the mouse button.

MacLab Instructions.
If you are using a Mac in our lab, click on the icon at the upper right corner of your screen labeled /. This will open a new window. Click on the Applications button in this window, and then select XDarwin from the applications and run it rootless. After a couple of minutes, you will get a terminal window . In this window, type ssh sunfire. Now you can type xmaple at the prompt to start Maple. Once Maple opens, you can use the buttons in the upper right corner of each window to resize the windows if you like.

Saving a file
To save a Maple session that you have been working on and give it a
name, choose File -> Save As from the menus at the top of the
screen. A Save As window will appear. If you want to save your file
under the name hwk1 (for example), enter hwk1 in the Filename box. If
there is already a *.mws in the box, make sure that you delete the *.
Then hit the Return (Macs) or Enter (UNIX) key, or click on OK. It is
best to keep file names simple , using only letters and numbers,
without any special symbols. In particular, it is a good idea to avoid
using spaces or periods. Maple will add the .mws or .mw extension to
identify the saved file as a Maple worksheet. Be careful about reusing
a file name from a previous session. For example, if last week you
made a file named Lines.mws and this week you open a new Maple session
and call it Lines.mws also, this will ERASE the file you created last
week. Notice that the Save As window lists the Maple files in your
current directory, so you can see which names you have already used.
Once you have given your file a name, you can do File -> Save, or
use the save icon at the top of the window.

Crashed Maple Recovery
After a crash of maple, there is a file in the same directory with
extension _MAS.BAK which contains all recent typing since the last
save. Load the file that crashed and also this _MAS.BAK file with
matching file name. Mouse-copy from the save-file into the crashed
file, to get back whatever typing is possible. Be selective, then save
the file in case of another crash event.

Copy/Paste

Maple rookies can avoid typing errors by copying known valid code with
the mouse (highlight, then ctrl-C), followed by paste onto a new line
(mouse click at target location, then ctrl-V). Copy works from text
documents and also PDF documents (copy requires adobe reader). To
paste, try the menu item PASTE. Then ctrl-V. Then RIGHT MOUSE BUTTON.
Then MIDDLE MOUSE BUTTON . If none of that works, then hold down the
SHIFT KEY and try the mouse buttons again.

Mac Workstation. If you are using a Mac, use the mouse to highlight
the command(s) you want to copy, then choose Edit -> Copy from
the menus.

Move the cursor to where you want to paste the text , then choose
Edit -> Paste.

Unix Workstation.
Press and hold down the left mouse button at the beginning of the
text you want to copy. Still holding the button down, drag the
mouse until you have highlighted the desired text. Release the
mouse button. Move the cursor to the position where you want to
paste. Click the left mouse button to mark this spot. Click the
middle mouse button to paste.

Repeat Paste
Copied text stays in memory and anytime you press the middle mouse
button (or choose Paste from the Edit menu) it will be pasted at the

current cursor position. This can cause surprises, if you
accidentally hit the middle mouse button. An immediate ctrl-z will
undo the error. For safety, mouse-copy some blank space to clear the
copied text.

Editing a Saved Maple file

It may take more than one session at the computer to complete your
analysis. Save your work on disk, and come back to the lab and open
your Maple file again to continue working. Often it will be useful to
take with you a printed copy of your Maple session so you can think
about what you have done so far, and how you want to continue when you
come back to the lab, or so that you can get help from a lab
instructor, a friend, or the instructor.

Cleaning Up. You can also delete text or commands by using the mouse
to highlight the area you want to delete , then hitting the Delete key.
To delete an entire computation or a plot, move the cursor into the
command block (square left bracket on the left screen edge) that
produced the computation or click on the plot. Hold down the Control
key and press the Delete key. The Edit menu has a duplicate.
Accelerate typing by learning key shortcuts from the menus.

Comments

In any command line, Maple ignores anything typed after the # symbol to
the end of that line. An example:

solve (3*x + 2*y - 5*z, z); # Solve for z in terms of symbols x and y

Block Comments

If you want to add comments between commands, move the cursor into the
first command. Then click on the icon T at the top of the screen (left
of [>) . A new text block appears below and the cursor moves into
the block. The pull-down menus and buttons at the top of the Maple
window allow you to control the size and style of the text you enter.
Default text is black at 12 points.

Printing

To print your Maple session directly from Maple, choose Print from the
File menu (or click on the Printer icon). In the Printer Setup window
that appears, check that Print Command is selected, rather than Output
to File, and click Print.

Alternatively, you can save your Maple session to a PDF file, then
then print it from acroread (adobe reader). Choose File --> Export
and save the worksheet as a PDF file, like hwk1.pdf. To send this
file to the printer, choose Print on the adobe reader (acroread) menu.

If you are looking for a simple way to email your worksheet, then try
the easiest solution: copy with the mouse and paste it into the email
program.

The file type .mws can only be printed from xmaple. Print PDF files
from acroread (adobe reader). Don't use lpr on PDF files, because
of printer filters that silently change the print file contents.

The print dialog box may offer to print to a file. Some maple versions
don't have the feature. Don't print to a file. Use the Export command
to output the worksheet to PDF, which is a portable format.

The dialog box inside Maple for the printer may have a default print
command (**lpr**). It may be changed to **lpr -l** or to **lpr - oraw** in order
to solve printing problems.

> **If you are having trouble printing, please ask the lab
> assistant for help.**

Coming back for more
When you come back to work on a Maple file that you've already started,
your task now is to reopen that file and get back to where you left
off. To open a file, choose File -> Open. An Open File window will
appear . In this window you will see a list of Maple files. Click on
the file that you want to open , then press the Enter key or click OK.

  It is not enough to just OPEN the saved file!

Although Maple displays a record of your last session, it unloads
variables. One way to get Maple to reload variables from last time is
to go to the beginning of your file and hit the Return key until you
get to the last line of the file. (You might want to use the arrow
keys to skip the lines that displayed plots or requests for help
files). This will ensure that Maple's memory of your last session is
restored. A shortcut for executing the entire worksheet is to click the
icon !!! at the top of the window. Inserting a #-sign at the front of
plot or help lines will quiet down the worksheet re-execute.

Using Maple

The best way to learn Maple is by using it. But first, a few remarks
about Maple. The symbol > ; is the command prompt, which Maple uses
to signal you that it awaits your command. Commands normally end with
a semicolon (;) if you want to see the output or a colon (:) if you
don't want to see the output. Maple is a programming language. It has
strict rules of punctuation, grammar, and spelling. If something is
not working right, check to see if you are following the rules. For
example, the Mapleengine will get confused if you write 2x instead of
2*x. Check for things like misspelled names or extra or missing
parentheses . If further thought doesn't clear things up, ask a human
for help. You will soon become an expert troubleshooter.

While learning Maple, you will often have questions about how a
particular command or function is used. Fortunately, Maple can help .
To ask about a command whose name you know, just type a question mark,
followed by the name of the command. Thus

```
?solve
```

gives information on the solve command. Scroll forward to the examples
at the end. Most questions are answered by the examples. If not
answered, then use the technical information at the beginning of the
help file. For specific help on how to do something in maple, use a
google search in a browser - it is faster than sorting through maple's
help system.

The help system in maple supports full text search or topic search of
Maple's help files. You will find these options under the Help menu in
the upper right corner of the Maple window. You will also find other
handy things , such as Introduction, New User's Tour, and Using Help.
Rookies are frustrated by the help system, but encouraged by google
searches, which can answer a specific question.

Next: Hand Calculator Examples.