Office Hours

Thursday: 12 -1

Room: GCS 342

Restart and Unassign

- Maple will save variable and function definitions
- This can cause problems when plotting expressions or performing calculations
- When starting to work with Maple, it is a good idea to enter the following command to clear all variables in memory
  - restart
- To clear the value assigned to a specific variable use the unassign command
- For example, to clear the value assigned to x:
  - unassign('x')
- Be sure to include the single quotation marks around the variable name, or else the command will not execute properly.

Functions vs. Expressions

- To define an expression in Maple:
  - f1:=$x^3 - 8$
  - f2:=$y^3 + 1$
  - Defined explicitly in terms of the variable chosen (i.e. x, y, etc.)
- To define a function in Maple:
  - g1:=x -> $x^3 - 8$
  - g2:=y -> $y^3 + 1$
  - Treats variable chosen as a more generic input

- Choosing to use a Maple expression or a Maple function results in subtle differences

- For example, when adding two expressions:
  - f3:=f1+f2

$$f3:=x^3+y^3-7$$

- Now if we add our two functions:
  - g3:=g1+g2

g3:=g1+g2

  - g3(x)

$$2x^3-7$$

- To evaluate an expression at a given point:
  - subs(x=0, f1)

-8

  - subs(x=0, y=1, f3)

-6

Correction

- In the lab last week, I stated that for many of the Maple operations to work, such as differentiation, mathematical statements had to be declared as functions.
- This is in fact, somewhat incorrect. Maple operations such as differentiation, limits, etc. work in a more direct fashion when mathematical statements are declared as expressions.

Calculating Limits with Maple

- Consider the function defined as follows
  - f:=x-> $\frac{4x^2-3x}{19x^2-11}$

- To evaluate the limit the following command will not work:
  - limit(f, x = infinity)

$$f$$

- Rather, the command must be entered as follows:
  - limit(f(x), x = infinity)

$$\frac{4}{19}$$

If we had instead defined this rational expression as a Maple expression:

- f := $\frac{4x^2-3x}{19x^2-11}$

The following line of code would work to find the limit:

limit(f, x = infinity)

$$\frac{4}{19}$$

- You can save worksheets as PDFs to print from home.

- In Maple
  - File -> Export as

  - Choose the appropriate file type, name and file path.

To insert lines into a previously executed Maple document or worksheet
- Math line above: ctrl + k
- Text line above: ctrl + shift + k
- Math line below: ctrl + j
- Text line below: ctrl + shift + j

- Maple can also plot implicit functions
- Consider the unit circle

$$x^2 + y^2 - 1 = 0$$

Or

$$x^2 + y^2 = 1$$

- To plot in Maple use the implicitplot command, which must be proceeded by the with(plots) command
- with(plots)
  - Will show as output a list of all of the maple plot functions that have been enabled
- implicitplot($x^2 + y^2 = 1$, x = -3..3, y = -3..3)

Maple can also plot functions in 3 – dimensional space

- Consider the same unit circle $x^2 + y^2 = 1$ as a cylinder in the xyz – plane
- To visualize this using maple, use the with(plots) command followed by implicitplot3d() command
- In this case, the second command would be as follows:

  implicitplot3d($x^2 + y^2 = 1$, x = -2..2, y=-2..2, z=-2..2)

- The scale for the x, y, and z axes must be specified in the command.

Maple Plot Options

- Maple provides many options to personalize plots created
- For an extensive list:

  https://www.maplesoft.com/support/help/maple/view.aspx?path=plot%2Foptions

- Or type into a search engine: “maple plot options”

References

1. http://home.wlu.edu/~finchc/Teaching/Math101E/MapleLabs/SailCalcMaple01.pdf

2. https://www.maplesoft.com/applications/view.aspx?sid=1520&view=html