Computing for mathematics handout 6 - Sage and the Class test

Lecturer: Vince Knight

Office: M1.30

email: knightva@cf.ac.uk

Office hours: Thursday 1300-1500

What you have learnt this week:

- How to carry out basic algebraic operations in Sage (solve equations, simplify expressions etc...)

What is Sage?

- Sage is a mathematics package built on Python. This implies that you can use the Python code you learnt in the first weeks of this class in Sage.
- Sage can be used to check formulae. For example: what is the formula for $\sum_{i=a}^{b} x^i$?

```
a = var('a')
b = var('b')
i = var('i')
x = var('x')
sum(x^i,i,a,b)
```

- Sage can also be used to plot functions (this could help when attempting to visualise a particular theorem):

```
k = 20
p = plot(x^0,color=rainbow(20)[0], legend_label="$x^0$")
for i in range(1,20):
    p += plot(x^i,color=rainbow(20)[i],legend_label="$x^{%s}$" % i)
p
```

  Here is something a bit more visually impressive (the code is slightly shorter):

```
k = 20
rb = rainbow(k+1)
sum(plot(sin(i*x)*i,color=rb[k-i], legend_label=r"${0}\sin({0}x)$".format(i)) for i in [0..
```

- Sage is a tool available to you to help you through your time at Cardiff.
- Sage allows you to share files with particular people (if you know their username) and also allows you to publish it.

Sometimes our server is buggy

Our server has been a bit buggy for some of you. I apologise and sadly there's not much I can do about it a part from show you how to get around the bugs.

- **DO NOT USE INTERNET EXPLORER** Internet explorer (IE) does weird things sometimes and so if you've written your code in IE and then opened up your file in a modern browser you might **still need to re-write your code** (not copy and paste) to make it work. **Alternative to IE are available on the networked machines**.
- If sometimes your code seems to work but does not evaluate try the following trick:

```
sol = solve(x^2==-1,x)
```

  Then in another cell simple show sol:

```
sol
```

- If all else fails close down your browser and open it up again. If there are very buggy things happening please let me know.

Class test

- format
- submitting
- schedule

What you should do next:

- **Finish revising for the class test**: be sure to be confident with the lab sheets 1 - 5 (Sage is not on the class test).
- **Start the next sheet**: this is a longer one looking at how to differentiate, integrate and plot in Sage.
- Contribute to the wiki.
- To make the best use of the lab sessions turn up having finished your sheets;
- If anything is still unclear **please** come and see me during office hours.