



UNIVERSITY OF
CAMBRIDGE

Department of Pure
Mathematics and
Mathematical Statistics

How to prepare a talk

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summer 2013

Why are you giving a talk?*

● **Transfer of understanding**

- No other purpose.
- * I will say three really important things.
This is the first. These will be marked with a *.

Wednesday, 14 August 2013

- Think about who your audience is. Aim your talk at them.
- You may hope that you impress the leader of the field, the appointments committee, the promotions committee, but you will do that best by giving a talk that will enlighten the humblest in your audience

Trial by graduate student: A moral tale

You are travelling in Strange Places, you are thrown in prison, accused of crimes unknown. You will be subjected to trial by graduate student. You are given one week in which to prepare a lecture on a topic you are familiar with....

At the end of the week, a graduate student, who is no more advanced than you are, who may be stupider than you, will listen to your lecture. At the end of the hour, he will be led away to be examined on the topic.

If he fails...

so perhaps it would be a good idea to keep things simple?

find memorable examples?

avoid unnecessary detail?

practice so you waste no time making mistakes?

The Focus: a second moral tale*



Wednesday, 14 August 2013

- “I’m going to climb in the Annapurna range” might suffice for impressing people in the pub six months in advance, but you need to decide which mountain you are going for.
- Once you have done this, suddenly the route becomes obvious, you know where your intermediate camps will be, you know how much food and other supplies you need..

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The Focus

- A single statement that you would like to explain. It should be a single sentence.
- A theorem.
- A hypothesis you wish to test.
- Example: *Simple representations of semi simple complex lie algebras are indexed by highest weights.*

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Similarly the focus.

- There is absolutely no call to explain everything you know/you have done/you are thinking about in a single talk/paper/poster. Choose one idea that you can say something about in the time allotted.

- Leave your audience wanting more.

- Generating conversation is part of the purpose, sometimes the entire purpose of your talk

- There are different types of seminar. Working seminar, best to present what you are trying to do, not what you have already written up. Comments are more welcome at that earlier stage.

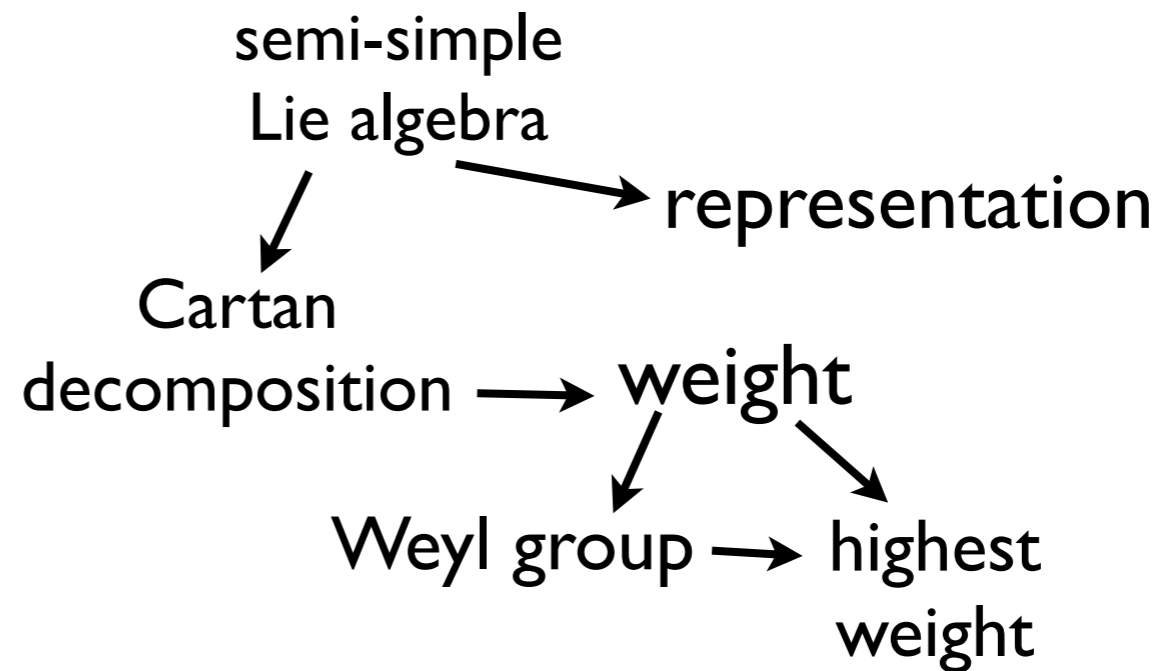
Focus to outline

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I. Write down all the words you need to explain. Draw arrows from word a to word b if you have to have explained a before b.

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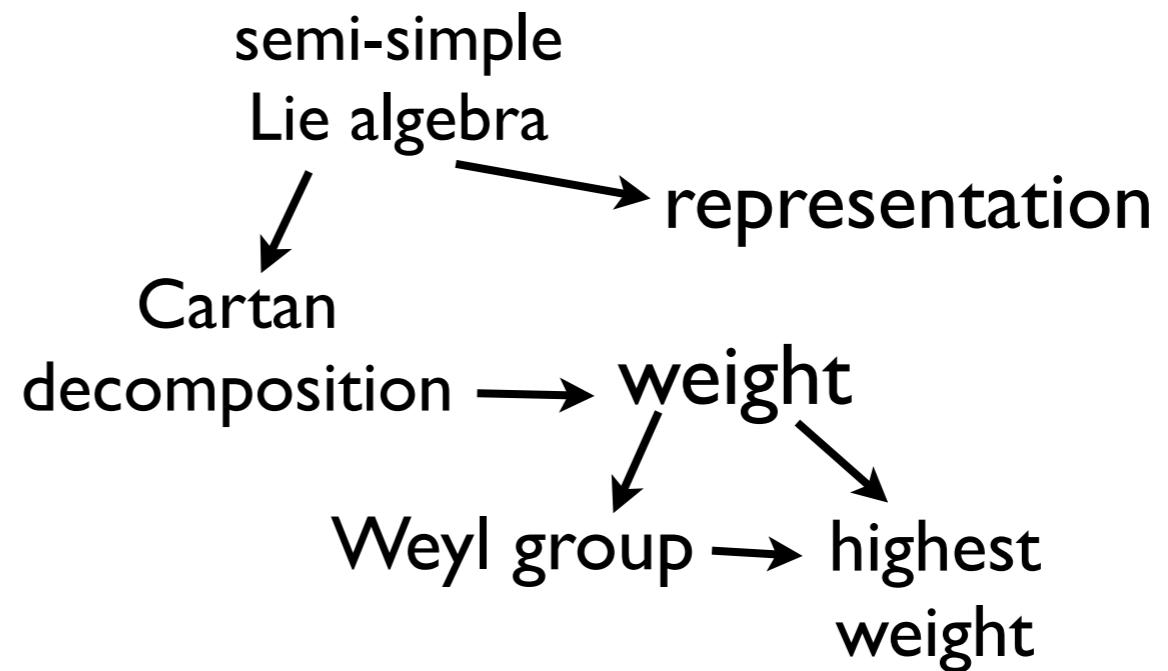
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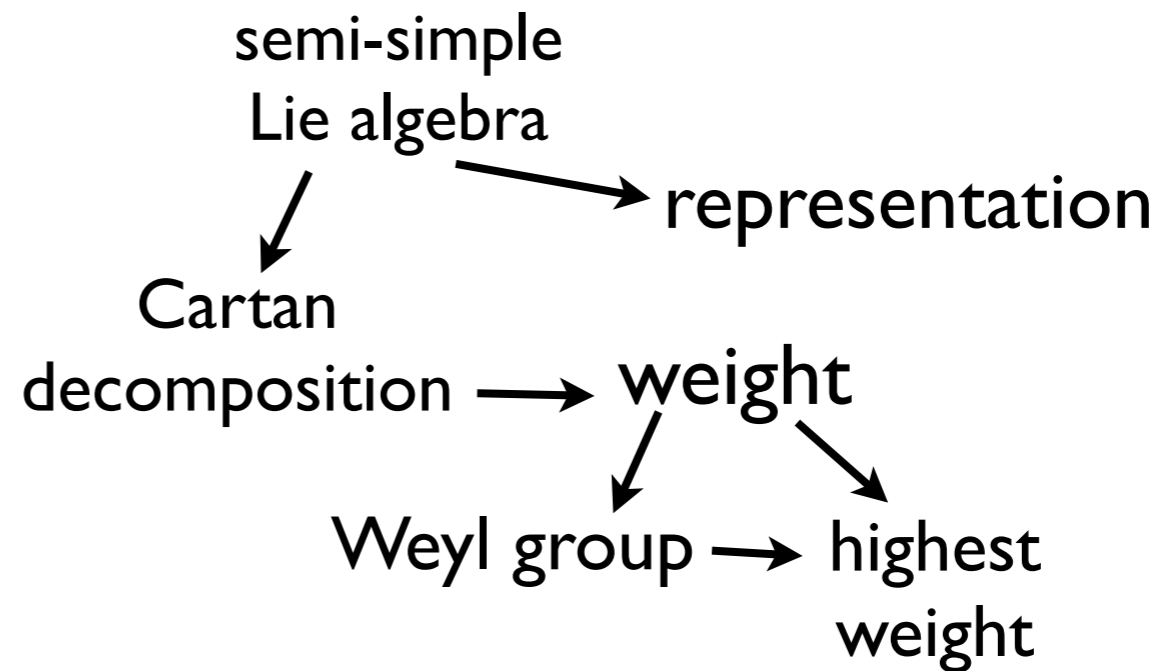
2. Well order this partially ordered set. This is your outline



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- Outline:
- Lie algebras
- Representations
- Cartan decomposition
 - Weights, roots
 - Weight diagram
 - Weyl group
 - Highest weights

The structure of a talk

Wednesday, 14 August 2013

- If you don't get the introduction right, people will stop listening.

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- Beginning - Introduction - the most important bit (10 minutes)
 - State, somehow, to state the focus of the talk.

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 - State, somehow, to state the focus of the talk.
- Middle (5 minutes)
 - Follow the outline you have made.
- End (5 minutes)
 - Restate your focus. Suggest ways in which you might go further.

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Start practicing

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- An empty room is a severe critic; it will snigger if you start talking nonsense. It becomes obvious you are wasting both your time and the empty room's time. Convince the empty room, and chances are even your stupid graduate student will understand it, and you will be proof against stage fright if the leader of the field is in the audience.
- You will not have time to develop the theory sensibly. Most particularly, you have somehow got to find some way to explain your focus without getting technical. How well you do this is a good indication of your mathematical ability/depth of understanding/care in preparation.
- Standard tricks:
 - Present your focus as a generalisation of something they know well.

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- **WRITE NOTHING***

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- Now start on the middle bit. Work one five minute section at a time.

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- Because you will not be willing to throw away that which should be thrown away.
- Because you will think that just because you have written it, you will be able to say it.
- Because it will take far more time to say it than you would ever believe.

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Shrinking mechanisms: alternatives to giving complete proofs/details.

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- Give a proof of a weaker result using the same ideas.
- Give an example to show it's at least plausible.
- Say “Magic” (but be prepared to give chapter and verse).

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- Because I will bite you if you flick to the next slide before I have finished trying to read the present one.

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- Because you will go too fast.

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- Go through the talk out loud until you can say it without hesitation. Spend time on the introduction.
- Time it.
- Make sure you get the words on the slides right before you fiddle with the fancy bits.

Starred stuff

- Your sole purpose in giving a talk is the transfer of understanding.
- Choose a good focus, and the outline will write itself.
- Talk it through first.