How to give a good talk?

Content Level, Organization and Boardwork

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May 3, 2019
Before we start ...

### Goals

- Raise consciousness of importance of giving a good talk
- Initiate discussions on how to give good talks
- Share some perspective and techniques of giving talks
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Applicable Scenarios
- Learning Seminars
- Research Seminars
- Colloquiums
- Lectures in Teaching
Talk preparation

Step 1: Know your audience

Step 2: Prepare for notes

Step 3: Practice

How much do you think about your audience when preparing talks?

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Talk preparation

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How much do you think about your audience when preparing talks?
Know your audience

- Professor
- Postdocs
- Graduate students
Know your audience

Many Talks :(

level of understanding

Professor

Postdocs

Graduate students
Know your audience

How to give a good talk?

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Know your audience — Example

At the beginning of a colloquium about elliptic curves ...
Know your audience — Example

At the beginning of a colloquium about elliptic curves ...

\[ S: \text{ scheme} \]

\[ \text{Def. An elliptic curve } E/S \]

\[ \text{is a proper smooth group scheme with fibers being geom. connected of dim 1.} \]
Know your audience — Example

At the beginning of a colloquium about elliptic curves ...

**Def.** An elliptic curve $E/S$ is a proper smooth group scheme with fibers being geometrically connected of dim 1.

Over $\mathbb{C}$

elliptic curve = complex torus + a point
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**Def.** An elliptic curve $E/S$ is a proper smooth group scheme with fibers being geometrically connected of dim 1.

**Over $\mathbb{C}$**

elliptic curve = complex torus + a point

Elliptic curves

$E : y^2 = x^3 + ax + b$

with $4a^3 + 27b^2 \neq 0$
What characteristics make a good talk?
What characteristics make a good talk?

When preparing for talks, what do you do to make your talk better?
What characteristics make a good talk?
When preparing for talks, what do you do to make your talk better?

Will focus on
- Organization
- Boardwork
Principle 1

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- **Contents**: Motivation, Background, Examples, Theorems, and Proofs.
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- **Length**: How many pages of note give an one-hour talk?
- **Contents**: Motivation, Background, Examples, Theorems, and Proofs.
- **Flow**: State the main theorem or goal as early as possible.
  - Theorem -> Ingredients of the proof -> Proof
    eg. Fermat’s last theorem
  - Motivation -> Background -> Theorem -> Proof ideas
    eg. Technical theorems
Principle 2

Audience should be able to understand the structure of the talk from the board.
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- **Environment:** Cut sections and paragraphs clearly
  - Write down “Section”, “Definition”, “Theorem”, “Proof”, etc.
  - To mark the end, draw a horizontal line or start a new board
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- **Example:** Example -> General Theory or General Theory -> Example
Let $E/\mathbb{C}$ be an elliptic curve. We say $E$ has CM if

$$\text{End}_\mathbb{Q}(E) \neq \mathbb{Q},$$

where $\text{End}_\mathbb{Q}(E) = \text{End}(E) \otimes \mathbb{Q}$. 

$E$: \hspace{1cm} $y^2 = x^3 - x$

Prop. $\text{End}_\mathbb{Q}(E)$ is imag. quad.

$$E \cong \mathbb{C}/\mathbb{Z}\omega_1 \oplus \mathbb{Z}\omega_2$$

$Z := \frac{\omega_1}{\omega_2}$
Let $E/\mathbb{Q}$ be an elliptic curve.
Let $\text{End}(E)$ be the endomorphism ring of $E$.

**Def.** $E$ has complex multiplication (CM) if $\text{End}(E) \otimes \mathbb{R} \neq \mathbb{R}$

**eq.** $E: y^2 = x^3 - x$ has CM.

**Prop.** If $E$ has CM, then $\text{End}(E) \otimes \mathbb{R}$ is imaginary quadratic.

**(pf.)** Write $E \cong \mathbb{C}/\mathbb{Z} \omega_1 + \mathbb{Z} \omega_2$

\[ \mathbb{C}/\mathbb{Z} \omega_1 + \mathbb{Z} \omega_2 \]
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$E \cong \mathbb{C}/\mathbb{Z}w_1 + \mathbb{Z}w_2$

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**eg.** $E$: $y^2 = x^3 - x$ has CM.

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**(pf.)** Write $E \cong \mathbb{C}/\mathbb{Z}w_1 + \mathbb{Z}w_2$

$z := \frac{w_1}{w_2}$
“Key words” are easier to read than “full sentence”.
Avoid heavy notations
Introduce notations one by one
Use abbreviations only if it is well-known or after it is introduced
“Arrows” are easier to follow than “where”
Boardwork

Having prepared the notes, you know what exactly to write on the board!
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- Clear Writing
  - Erase the board completely
  - Write large enough
  - Separate characters, especially names
  - Color chalks: “yellow, orange” are clearer than “red, blue”.
    (The latter can be used for circling or drawing a curve.)
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- **Use Board space linearly**
  - Draw vertical lines to divide the board into suitable widths
  - Write from up to down, left to right
  - Align text to the left
  - Measure the board and decide where to write what beforehand
    (for extremely important talks)
Practice and Seek for feedback!