

Chapter 4:

Presentation Techniques

Importance of Written and Oral Presentations

Mathematicians must present their work in **written and oral form** → **papers & talks**.

Otherwise: **reinvention** of the results is **cheaper than** to **use available results** from the literature.

Embed oneself into the scientific community of one's own field.

Types of Oral Presentations

- ◆ short remark in a discussion,
- ◆ talk in seminar,
- ◆ **talk at a scientific conference**,
- ◆ course consisting of several lectures.

Giving Mathematical Talks

Most important principle for the speaker:

Save the time of the audience !!!

Steps When Preparing a Talk

- ◆ Analysis of audience
- ◆ Specification of goals
- ◆ Collecting & processing material
- ◆ Preparation of the presentation
- ◆ Technical matters
- ◆ Analysis of success

Analysis of Audience (see "Writing Papers")

Ask yourself:

- ◆ **For whom** you want/have to give the talk ?
- ◆ **Scientific/professional background** of the audience ?
- ◆ What knowledge to I **presuppose** ?
- ◆ Is the audience already **motivated** to hear the talk ?



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Specification of Goals (see "Writing Papers")

A topic for a talk is not yet a goal !

Specify goals in the form of **operational goals**, i.e. by describing the operations (actions) the audience should be able to perform after having attended the talk.

Easy way to check the quality of one's own talk: If audience from the intended group of listeners are not capable of performing the operations specified as the operational goals then the talk does not meet the goals.

Clear operational goals give the audience a clear **motivation** to follow the talk, namely the desire to acquire the skills that are described by the goals of the talk.

Goals need to be **structured** (subgoals, prerequisites, independence).

Hierarchical structure of goals → hierarchical structure of the presentation.



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Collecting Material (see "Writing Papers")

Literature needs to be studied:

- ◆ **Finding** relevant literature items.
- ◆ **Retrieving** the relevant literature items.
- ◆ **Processing** the retrieved literature items.
- ◆ **Documenting** the used literature items.



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■ Processing Material

Still a lot of work, because:

- ◆ mathematics is often presented in **different (and incompatible) notation**,
- ◆ **details are often left out**, auxiliary notations are needed,
- ◆ solution methods are presented in a **general form** where the special case that is actually needed is often hard to recover,
- ◆ solution methods are presented in a **special form** that is not applicable to the problem at hand,

- ◆ the actual **problem is different** from the problem treated in the literature,
- ◆ **parts in the literature are incomplete or even wrong**,
- ◆ etc.

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Goal of processing the material: **Completely understand and master the topic !!!**

Do not consider: **Audience, psychological/pedagogical/methodological factors.**

Interaction: Specification of goals \leftrightarrow Processing material. Start with specification of goals.

- ◆ **Analysis of Relevance:** What needs to be skipped? What needs to be elaborated in more detail?
- ◆ **Didactical analysis:** What needs to be replaced by one's own versions?
- ◆ **Analysis of logical correctness:** Correct logical errors detected in the literature.

As often as possible: **Elaborate your own ideas !!!** (Examples, connections to other subjects, applications, etc.)

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Preparation of the Presentation

Written preparation of Presentation:

- ◆ Structure of goals
- ◆ Psychological factors
- ◆ Method of presentation (lecture, discussion, etc.)
- ◆ Time constraints
- ◆ Written trace of the presentation
- ◆ Teaching aids (blackboard, overhead projector, beamer, flip chart, etc.)
- ◆ Organizational details.

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Some Psychological Aspects ...

■ Motivation

Motivation of the audience plays a crucial role.

How to motivate the audience?

- ◆ Appear motivated yourself.
- ◆ **Describe the goals** at the beginning of the presentation.

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■ Natural Structure for Oral Presentations

- ◆ **Motivation** by examples.
- ◆ **Development of solution method** by examples.
- ◆ **Systematic presentation** of results (incl. proofs or proof ideas).
- ◆ **Application of the method** to initial examples, other examples.
- ◆ **Check** of success.

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■ Learning Process Needs Time for Deactivation

■ Well-associated Information is Better Memorized

■ Therefore ...

Alternating phases of:

- ◆ **presentation** of new material (≈ 15 Min.) and
- ◆ **association** of new and known material (≈ 5 Min.)

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Written Trace of the Presentation

Audience should have the possibility to obtain a written trace of the presentation.

- ◆ Distributed material.
- ◆ Own notes.
- ◆ One main note + references to others.
- ◆ Well-structured for someone who did not attend the presentation.

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Teaching Aids

- ◆ **Present essential** points
- ◆ **Omit unessential** points
- ◆ Present important information in an **optically attractive form**.

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■ Blackboard

For: Development of ideas.

Not for: Tables, diagrams, graphics.

Limited speed!

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■ Overhead Projector

For: Presentation of information in one step.

Not for: development of ideas, proofs. (→ Uncovering part after part.)

Danger: Speed!



■ Laptop + Beamer

Can combine the advantages of both blackboard and transparencies.

Danger: Speed!



■ Accompanying Written Material

Summarize important information.

Graphics, pictures, tables, figures, etc.



Organizational Preparation of Presentation

Embed main part into

- ◆ **introduction**: organizational remarks, repetition of last lecture, motivation
- ◆ **conclusion**: repetition of main contents, preview/outlook.



The Presentation

It is **difficult to give general rules** (taste!), but:

- ◆ Try to develop **your personal style!**
- ◆ Personal style should reflect **your own personality!**
- ◆ Watch others and **adapt things that you like** and **avoid things that you dislike.**



■ Some Hints

- ◆ Establish contact to audience.
- ◆ Do not look to walls.
- ◆ Do not speak to the blackboard / overhead / computer.
- ◆ Self-confidence through good preparation and mastery of the subject.
- ◆ Blackboard: Announce usage, carefully erase, turn to audience, don't cover, don't project onto.

- ◆ Overhead: Not too many slides, not too fast, don't write onto, don't cover, don't uncover too much, copying material onto (attention: size).
- ◆ Check equipment before!

