

Skills for Giving a Good Presentation

Bernd Schroers
Department of Mathematics
Heriot-Watt University, UK

AIMS, November 2010

Outline of Talk

General Comments

Writing the Talk

Giving the Talk

Summary

Why Give a Talk?

Why Give a Talk?

- ▶ Communicate key ideas
- ▶ Give audience a feel for your work
- ▶ Interact with audience - answer questions
- ▶ Emphasize what you believe to be important

Make sure that there are one or two **'take home messages'**

Talk versus Research Paper

Advantages of talk

Talk versus Research Paper

Advantages of talk

- ▶ Can simplify and be non-rigorous
- ▶ Can give overview, with few technical details
- ▶ Can present unfinished work and negative results
- ▶ Can give personal opinion and get your personality across

Talk versus Research Paper

Advantages of talk

- ▶ Can simplify and be non-rigorous
- ▶ Can give overview, with few technical details
- ▶ Can present unfinished work and negative results
- ▶ Can give personal opinion and get your personality across

Disadvantages of talk

Talk versus Research Paper

Advantages of talk

- ▶ Can simplify and be non-rigorous
- ▶ Can give overview, with few technical details
- ▶ Can present unfinished work and negative results
- ▶ Can give personal opinion and get your personality across

Disadvantages of talk

- ▶ Listener cannot pause or go back or scan ahead
- ▶ Strict time limit
- ▶ Difficult to convey technical results

Bibliography

1. **Handbook of Writing for the Mathematical Sciences**, 2nd Ed, by N. J. Higham, SIAM, 1998, ISBN 0 89871 420 6
2. **The Short Talk**, by C. F. Van Loan, 2000,
<http://www.cs.cornell.edu/cv/shorttalk.htm>
3. **On Writing**, by Stephen King, Hodder and Stoughton, 2000, ISBN 0 340 82046 2

Outline of Talk

General Comments

Writing the Talk

Giving the Talk

Summary

Some Writing Principles

- ▶ Good writing... is thinking made visible. (Ambrose Bierce, 1937)

Some Writing Principles

- ▶ Good writing... is thinking made visible. (Ambrose Bierce, 1937)
- ▶ Write with the door closed, rewrite with the door open. (John Gould, quoted in Stephen King, 2000)

Before and After Examples

The sequence $\{z_i\}_{i=1}^{M-1}$ arises when Euler's method with stepsize $\Delta t = 2/N$ is applied to the ODE

$$z''(x) + p(Nx + 1)z'(x) = 0, \quad (5.2a)$$

subject to the initial conditions

$$z(0) = 0, \quad z'(0) = \frac{N}{2}. \quad (5.2b)$$

This ODE has solution

$$z(x) = \sqrt{\frac{N}{2p}} e^{\frac{p}{2N}x} \frac{\sqrt{\pi}}{2} \operatorname{erf} \left(\sqrt{\frac{Np}{2}} x + \sqrt{\frac{p}{2N}} \right), \quad (5.3)$$

where $\operatorname{erf}(y) := \frac{2}{\sqrt{\pi}} \int_0^y e^{-t^2} dt$ is the error function.

Our aim is to prove that Euler's method **converges** to the correct solution (5.3).

This convergence is **relative** not **absolute**.

Key Observation

Sequence $\{z_i\}_{i=1}^{M-1}$ arises from Euler with stepsize $2/N$ on

$$z''(x) + p(Nx + 1)z'(x) = 0, \quad z(0) = 0, z'(0) = \frac{N}{2}$$

$$\text{Solution: } z(x) = \sqrt{\frac{N}{2p}} e^{\frac{p}{2N}} \frac{\sqrt{\pi}}{2} \operatorname{erf} \left(\sqrt{\frac{Np}{2}} x + \sqrt{\frac{p}{2N}} \right)$$

Need to prove **convergence**

Relative not **absolute**

The discrete optimization problem $\min_{x \in \mathcal{P}} x^T (D - W)x$, is too computer-intensive to be tractable.

The relaxed problem $\min_{x \in \mathbb{R}^N} x^T (D - W)x$, with constraints $\|x\|_2 = 1$ and $x^T \mathbf{1} = 0$ can be solved, to give $x = v^{[2]}$, where $v^{[2]}$ is the **Fiedler vector**.

In order to recover a permutation $x \in \mathcal{P}$, we look at the relative ordering of $x = v^{[2]}$: $x_i \leq x_j \Leftrightarrow v_i^{[2]} \leq v_j^{[2]}$.

Note that relaxed solution is invariant to scaling or shifting, which explains the constraints.

Computing this relaxed solution is what we will refer to as the **spectral reordering algorithm**.

This approach dates back to **Donath & Hoffman 1972, Fiedler 1975**.

Relaxation

Hard: $\min_{\mathbf{x} \in \mathcal{P}} \mathbf{x}^T (D - W) \mathbf{x}$

Easier: $\min_{\mathbf{x} \in \mathbb{R}^N} \mathbf{x}^T (D - W) \mathbf{x}$, s.t. $\|\mathbf{x}\|_2 = 1$ and $\mathbf{x}^T \mathbf{1} = 0$

Solution: $\mathbf{v}^{[2]}$, **Fiedler vector**

Recover $\mathbf{x} \in \mathcal{P}$ from relative ordering of $\mathbf{x} = \mathbf{v}^{[2]}$:

$$\mathbf{x}_i \leq \mathbf{x}_j \Leftrightarrow \mathbf{v}_i^{[2]} \leq \mathbf{v}_j^{[2]}$$

Note: invariant to scaling or shifting of relaxed solution

This the **spectral reordering algorithm**

Dates back to **Donath & Hoffman 1972** and **Fiedler 1975**

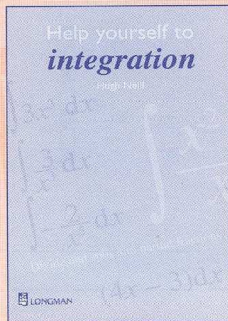
A Big No-No

Typos, **grammatical errors** and **ambiguities** are exaggerated by the big screen!

Examples . . .

**Are algebra and calculus a
problem for your student's?**
*The solution is the
Help yourself series . . .*

NEW



Help yourself to . . .
Algebra
Advanced Algebra
Differentiation
Integration

A series of practice books for undergraduate Sciences and Engineering students.



ACC[®]
TELECOM

ACC Telecom can help you :-

- 1 Save money on your phone bill.**
- 2 Donate money to Manchester University Annual Fund.**
- 3 A percentage of your monthly bill goes to the Fund.**
- 4 It's easy - each month your donation will be shown on your bill.**



THE U
of MA

Choose your medium

Choose your medium

	Advantages	Disadvantages
Blackboard	It's live! Natural, moderate pace	No safety net Slow pace
Slides + projector	Neat, Flashy! Recyclable, adaptable Handouts easy Easily 'shipped'	Cannot improvise Stale ? Technical problems
Slides + OHP	Neat Recyclable Live elements	Cannot improvise Stale? Technical problems

Advice for Writing the Talk

Advice for Writing the Talk

- ▶ Write for your audience
- ▶ Choose your title carefully
- ▶ Tailor material for the time allowed
- ▶ Structure your talk - and tell the audience about the structure
- ▶ Insert and advertise exit/entry points if possible
- ▶ Perpare 'floating material' to add/subtract
- ▶ Repeat material where necessary

Advice for Appearance of your Presentation

Use

- ▶ clear, sparse text
- ▶ legible fonts and **strong** colours (and not too **colourful**)
- ▶ simple background and margins
- ▶ pictures instead of words

Advice for Appearance of your Presentation

Use

- ▶ clear, sparse text
- ▶ legible fonts and **strong** colours (and not too **colourful**)
- ▶ simple background and margins
- ▶ pictures instead of words

Decide if you want

- ▶ to pause...

Advice for Appearance of your Presentation

Use

- ▶ clear, sparse text
- ▶ legible fonts and **strong** colours (and not too **colourful**)
- ▶ simple background and margins
- ▶ pictures instead of words

Decide if you want

- ▶ to pause...
- ▶ or not to pause

Outline of Talk

General Comments

Writing the Talk

Giving the Talk

Summary

Preparation

Preparation

- ▶ Prepare accompanying notes if necessary
- ▶ Practise for timing and confidence
- ▶ Check out location and equipment
- ▶ Prepare for technical problems

Nerves are natural!

The Mechanics

The Mechanics

- ▶ Where to look?
- ▶ Where and how to point?
- ▶ Where to stand?
- ▶ How to wrap up?

Delivery

- ▶ Be punctual!
- ▶ Be enthusiastic!
- ▶ Be audible!
- ▶ Do not read out your own text!
- ▶ If you mess up - just keep going!

When you are done....

Answering questions is the hardest part!

- ▶ Don't switch off!
- ▶ Try to predict question and prepare answers!
- ▶ Be honest!
- ▶ If desperate, answer a different question!

Outline of Talk

General Comments

Writing the Talk

Giving the Talk

Summary

Ten Commandments (N. J. Higham)

- ▶ Design the talk for the audience
- ▶ Prepare thoroughly and rehearse the talk
- ▶ Produce clear, legible slides
- ▶ Arrive early and check the lecture room
- ▶ Speak slowly and loudly
- ▶ Be enthusiastic about what you say
- ▶ Look at the audience as you speak
- ▶ Don't fidget with the slides or the pointer
- ▶ Finish on time (or early)
- ▶ Answer questions courteously and concisely, and admit it if you don't know the answer

Final Thoughts

- ▶ Good talks are not written, they are **re-written**
- ▶ **Content** is more important than style

- ▶ Develop a **critical ear**—**decide for yourself** what makes a presentation **good** or **bad**