Notes on English

Most of the English mistakes came from one of the following categories. These are understandable mistakes, which can only be improved by reading and listening to good English, and getting familiar with typical phrases used in mathematical English.

- Mistakes with word order.
- Incorrect or missing prepositions.
- Mispronunciations.

Some people have a habit of repeating certain phrases, or using sounds like "hmmm" too much. This can be helped by reading from a prepared script, but reading from a script often sounds unnatural and it is a bad idea to rely on a script because it is not always possible to have a script, particularly when presentations return to classrooms.

Make sure to check the correct English word for mathematical terms — it may not be a direct translation of the Polish word. Ask or look in a textbook if you need to.

It was encouraging to hear that everybody could explain their work in English. The best speakers used good vocabulary and variety, and their words had a nice flow. Hopefully everyone can make improvements in these areas in the second presentation.

Notes on presentation style

Three crucial points to remember when planning and preparing.

- Never go over time (but make sure your presentation is not too short).
- Communication: ensure the slides are visible and legible; speak clearly and make sure the audience always knows what you are doing.
- Clear up anything you are confused about before the talk. Don't be afraid to admit if you do not know something.

Timing can be difficult to get right; with experience it becomes easier to know how much material to prepare. If you are unsure during the presentation then don't be afraid to take a moment to ask or find out how much time is left, so that you can decide if anything needs to be changed.

- Those who gave computer presentations tended to finish too early. It is useful to prepare some extra material which can be used if the main presentation is finished early.

- Those who wrote by hand during their presentation tended to go over time. It is useful to think about some parts of the presentation which can be skipped, without losing the main points of the presentation (for example, state a result but skip the proof if time is short).

Find a good balance between what is written and what you say — the essential points must be written, but extra explanation can be added verbally.

- In many of the presentations the speaker only read what was written on the slides, without changing pace or tone. If everything is read in the same way then it is difficult for the audience to know what is important; the main points can be highlighted and given extra importance by speaking more slowly or spending more time on them.

- Reading out an equation (or other piece of mathematical notation) word-by-word is very difficult for the audience to follow. Instead try to say in words what the equation means (for example "this is the associativity axiom") or the important idea of the calculation (for example "each x cancels with x inverse").

- Use pauses in your speaking to emphasise a point, or to give the audience time to read or understand.

- Do not change slides too quickly after finishing what is on the slide — give the audience time to understand.

Make sure to explain what you are doing at all times. Use phrases like "now we use this definition to...", "next I will explain the proof...", "Now we move to a new section...", *etc.*

All the presentations were prepared well and easy to read on the screen. Some extra things to remember.

- If you are using computer-prepared slides then make sure all the text is visible and not too crowded. Use full-screen mode.

- If you are writing make sure the writing is easy to read.

- If you are using a camera to show your writing make sure the page is in focus.

In the final class students discussed their experiences giving presentations in this course, and made the following points.

Hand-written presentations Several students advocated that handwritten presentations are the best way to present mathematics — because the material is developing on screen it is easier for the audience to follow and easier for the speaker to explain what is happening. Students found that writing by hand helps them to keep to the correct pace and avoid the mistake of going too quickly. Hand-written presentations allows more flexibility during the presentation, such as adding extra explanations or

answering audience questions. Several students noted that it is difficult to talk and write simultaneously, particularly when using a second language. One should only choose this method if they are certain their handwriting is legible for the audience.

Computer presentations This method requires extra preparation before the talk. Some students found that it was easier to present in their second language using prepared slides; if one is not confident in their speaking ability (either public speaking or using a second language) then this style can help as the important points can be read by the audience. A speaker who is struggling with nerves or language skills may also choose to read what is written on the slides, but this quickly becomes boring for the audience.

Presenting mathematics We discussed that it can be difficult to convey the mathematically significant parts of a presentation clearly — when planning a talk one should think carefully about how to emphasise the important points. One way to reduce the burden on the audience (who may be unfamiliar with notation and concepts) is to read symbols using natural language (for example, if $[a]$ denotes the integer part of a then say "integer part" during the presentation, not "open square bracket, a, close square bracket"). Reading expressions symbol-by-symbol is often boring for the audience: if a mathematical expression can be expressed in words then use words (for example, read $x(y+z) = xy + xz$ as "the distributive property"); for more complicated expressions it might be best to mention important features, and leave time for the audience to read the full expression themselves. It was mentioned that one should think about the mathematical content from the perspective of the audience, who may not be familiar with the subject — use reminders to help the audience follow. Students spoke of how examples and diagrams are important for helping the audience understand.

Presenting in English Remember that it is normal to feel stressed and/or nervous when giving a presentation, especially if using a foreign language. Stress and nerves often make students speak more quickly, but with experience this can be managed. Many of the students found that it was difficult to find the correct mathematical terminology in a second language — internet translation is not useful for mathematical terms, and it can be difficult to search for a term one does not know. There were a number of helpful suggestions: one can try looking in textbooks, or searching for articles online. Students also discussed that it is very difficult to find the correct terms for reading equations and other symbols, such as "integral with respect to x", as written resources do not always explain how these should be pronounced. One useful suggestion for this problem is to search online for video lectures, for example on YouTube or institution websites. Such video lectures can also be useful for learning good sentence structure and word choices.