Some teaching principles

Silvère Gangloff

22 avril 2019

This document is aimed to describe some principles that came out of my teaching experience at the university - mainly tutorials. I extracted them from my mistakes while teaching to students but also from communicating to other researchers. I see this analysis as a way to make research and teaching interact and enlighten the fact that teaching is a sort of research in itself. In some way, understanding how to understand and perceive an external flux of information can be helpful in order to guide oneself in the spectrum of research possibilities. On the other hand, the difficulty of communication in research helps see us how difficult is communication in general and how we can improve our way to teach.

These principles are rather simple and can be shortly described, on one hand, as the observation that teaching has always to be adapted more and more to the students (their perception of the class, their mind set, level, etc.), and that there are moments in teaching for which the interaction between the teacher and the students have to be differenciated.

On tutorials

There are two things I want to say about tutorials. First, I believe that the tutorial time in itself is a moment of informal exchange, between a specialist in mathematics who is used to mathematical conventions, language, interests of a mathematician, mathematical approach of a problem (non exhaustive list), and students who are not used to these. This is important since they are the key to an understanding of mathematics. Of course, they also need to get familiar with the object of the course. A way to achieve both is to interact in a direct way with students. This allows an adaptation to the person (his or her difficulties or expectations, according to the his/her level), which is crucial for communicating the interest in mathematics, and at the same time a direction of their attention directly to the object, in a way that is adapted to them. That is the reason why, when I have choice, I prefer to forget about lecturing in order to have more time for interacting directly with students.

Teaching documents

While I focus on direct interaction during the tutorials, students still need a written model that they can follow, memorize and reproduce (after adapting it) during the exams. For this purpose, I write and propose them a full model of writing for any problem that was considered during the tutorial, and leave to demand the corrections of other exercises. It is the moment for me to remember the main difficulties that were encountered during the tutorial and write them as remarks, so that it helps most of them. I include drawings, as much as possible, and combine informal explainations before writing the solutions with very formal and detailed solution, which is a model of what is expected for the exam, and even more.

Correction of exams

The way we correct the exams have to depend on the group of students and also on the object of the class itself : on the difficulties that were encountered, on the matching between the level expected and the actual level of most of the students, etc. In order for me to adapt to these

constraints, I first read a significant proportion of the copies in order to understand better the spectrum of capacities the students have in the group, what they are able to do easily and what they don't, as well as what was not done by any of them. With an adapted level of expectation, students are not discouraged and can feel some progress, and actualise it. According to this process, the second step is to establish a detailed program to attributed grades.