TEACHING STATEMENT

CHENXI WU

1. TEACHING EXPERIENCE

I've taught a variety of lower and upper level undergraduate classes in Rutgers, including linear algebra, PDE, linear optimization and introduction to logic and proofs, and, together with TAs and graders, was responsible for all aspects of the courses taught. The students are generally from a diverse academic background, from STEM to finance, economics to humanities. Before arriving at Rutgers, I also taught Calculus 1 in Cornell (which has a course coordinator and a uniform final exam) and was TA for many courses on both undergraduate and graduate level. The complete list of courses taught, and my lecture notes for recently taught courses, as well as summaries of student evaluations, can be found on my webpage at `https://wuchenxi.github.io`.

Other than teaching in Rutgers and Cornell, over the years I also volunteered in various outreach and other activities aiming at communicating mathematics to a wider audience. For example, while in Cornell, I volunteered for the math club of Ithaca high school, helping high school students there preparing for math competitions; I volunteered for the Math Explorer's Club in 2016, teaching high school and middle school students the concept of genus of a closed surface, spherical geometry and Gauss-Bonnet theorem. Since I moved to Rutgers, I volunteered as TA for the F.E.M.M.E.S program in university of Michigan in 2017, and also lectured in the KAIX summer school to an audience of math or applied math students from Thailand, Vietnam and Korea in the summer of 2019.

2. TEACHING PHILOSOPHY

I find it very important to provide motivations and contexts to the student in teaching. For example, while teaching linear algebra, I would give diverse examples of the application of the topics covered in the class both in other areas of mathematics and in real life, for example the Fibonacci sequences, linear regression, discrete Fourier transform and finite Markov chains; while teaching logic and proofs, I would provide examples of logical reasoning about things in real life, and many students told me that it helps clarifying many logical concepts and fallacies.

In terms of course design, I generally try to organize the course materials I am supposed to cover into several major themes, and keep the number of topics covered in each lecture small. For example, for the linear algebra class, I organize the different parts of the course according to the different kind of matrix transformations (elementary row/column operations, conjugation, similarity), their corresponding normal forms, and their geometric meaning. At the beginning of each lecture I would tell the students clearly what topics will be covered, and during the final review I can list the concepts, theorems and algorithms in a more structured way according to a few main themes, emphasizing their similarities, differences and

other connections. I would also make sure to include ample amount of examples and exercises on different levels of difficulty, the harder ones would focus on testing students' understanding of the various concepts and their connections, especially in a setting they are not familiar with.

Furthermore, in many of the courses taught I use other ways to engage students beyond lectures. In the course on proofs, there is a 40 minute section per week when students work on a few harder problems in group and the TA and I would walk around and providing individual help, and each group would be required to hand in their solution in the next week. Many students find this format to be very helpful as this allow them to learn from each other which can sometimes be very effective. Also, while teaching the linear optimization class, I would make sure to provide source code for the implementations of the algorithms covered, as well as intermediate results of those algorithms on a specific example with detailed comments, so that students can use them as a reference if they don't remember some minor details of those algorithms.