MATH272X: DIFFEOMORPHISMS OF DISKS – SYLLABUS
FALL 2017, HARVARD UNIVERSITY

Our goal in this class is to discuss classical results and recent advances in the study of groups of diffeomorphisms of disks. Topics will include the results of Smale and Hatcher, the relation to exotic spheres and smoothing theory, the relation to cobordism categories, and the relation to algebraic K-theory. If time permits, we might also discuss the relation to configuration space integrals. Though the course will start with a brief overview on differential topology (through its applications to diffeomorphism groups of low-dimensional disks), previous knowledge of this material will be helpful and is recommended.

1. Course organization

1.1. **Contact information.** Alexander Kupers (Lecturer)

- Email: kupers@math.harvard.edu.
- Office: Science Center 333I.

1.2. **Course material.** Lecture notes will be posted to the website https://canvas.harvard.edu/courses/31199, as will be references to background material and further reading. There are no required materials.

1.3. **Graded work.** There will be three forms of graded work:

- (1/3 of grade) A midterm paper.
- (2/3 of grade) A term paper.

Detailed instructions and a list of suggested topics can be found on the course website, but let me summarize by saying these should be expository papers on a topic related to the course of 4–8 pages for the midterm, and 8-16 pages of the term paper. Our general policy about late work is strict: we will not permit assignments to be handed in late without some written mandate from a doctor or the university administration.

1.4. **Meeting times.** Our meeting times for lectures and for office hours are as follows. I will announce changes or deviations in lecture and on the website.

- Lectures: MWF 1:00pm-2:00pm, Science Center 411.
- Office hours: W 4:00pm-6:00pm, Science Center 333I. Additional times by appointment.

1.5. **Important dates.**

- Course registration deadline: Thursday, September 7th.
- Midterm paper topic due: Wednesday, October 4th.
- Midterm paper rough draft due: Wednesday, October 18th.
- Midterm paper due: Wednesday, October 25th (2:00pm).
- Final paper topic due: Wednesday, November 8th.
- Final paper rough draft due: Wednesday, November 29th.
- Final paper due: Monday, December 11th (2:00pm).

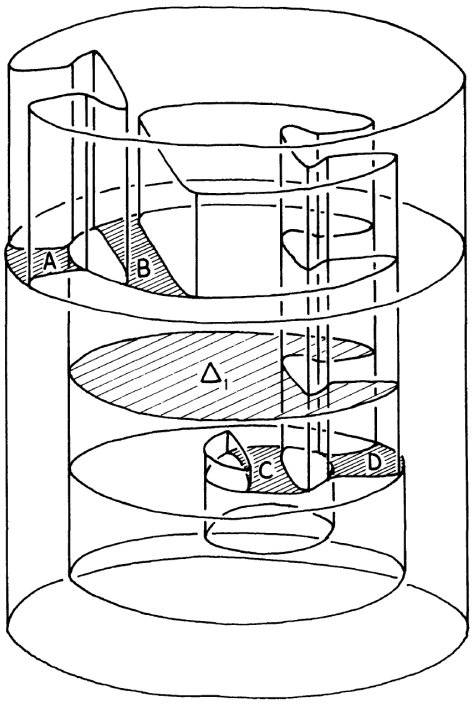

Figure 1. Figure 7.3 of Hatcher's *A Proof of the Smale Conjecture,* $\mathrm{Diff}(S^3) \simeq O(4)$.