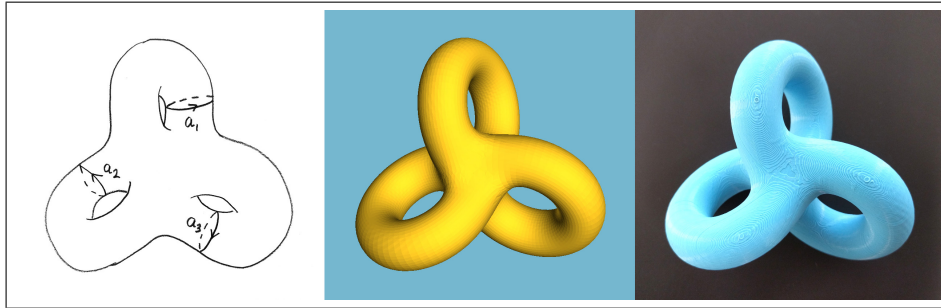


Math 569 - Representations of surface groups

Emily Dumas

Spring 2017



1. GENERAL INFORMATION

Web Page <http://dumas.io/math569/>
Location Taft Hall 300
Meeting Time Tue & Thu 3:30-4:45pm
CRN 39674
Email emily@dumas.io
Office Hours Mon and Thu 2-3pm
Text F. Labourie, *Lectures on Representations of Surface Groups*.
European Mathematical Society, 2013. ISBN 978-3-03719-127-9

2. COURSE OVERVIEW

In this course we will study the space of representations of the fundamental group of a surface (i.e. a real 2-manifold) into a Lie group G . We will investigate the local and global geometry of this space, including questions about connectedness, smoothness, singularities, and complex and symplectic structures. Following the main thread of the textbook, we will discuss a remarkable formula that gives the symplectic volume of the space of representations when G is compact.

After that, we will branch out and consider some special classes of surface group representations with nice geometric properties, such as representations in $SL(2, \mathbb{R})$ coming from hyperbolic structures, representations in $SL(2, \mathbb{C})$ associated to complex projective structures and to bending deformations of surfaces in hyperbolic 3-space, and representations in $SL(3, \mathbb{R})$ associated to convex real projective structures. The idea of studying these examples is to see how some general phenomena play out in these concrete situations, and also to discuss the unique features of each one.

3. PREREQUISITES

This is a course for students with some experience with differentiable manifolds and algebraic topology. We will sometimes venture into advanced topics where students who have taken a second course in differentiable manifolds or a course in Riemannian geometry would benefit most; however, we will regularly return to more broadly accessible material.

4. COURSE POLICIES

Announcements: The primary means of communication for important course announcements and information are:

- Posting to the course web page (for all course information)
- Email to everyone on the roster of enrolled students (for special announcements)

Exams: There are no exams in this course.

Absences: Students who miss lectures should contact another student in the class to request lecture notes or a summary of the material covered. Such materials will not be provided by the instructor.

Exercises: A list of exercises will be maintained on the course web page and expanded throughout the semester. Such problems can be submitted in lecture at any time, and will be returned promptly with comments. Resubmission is allowed. Students are encouraged to discuss course material and problems with one another. However, collaboration must be acknowledged in any work that is submitted for credit (for example by writing “In collaboration with Jane Doe” at the start of the solution to a problem).

Presentations: Each student enrolled in the course will be required to give a 30-minute in-class presentation at the end of the semester on a topic related to the course material and selected in consultation with the instructor. Topics of such presentations must be selected by **Tuesday, March 14**.

These presentations will be scheduled either in the last few regularly-scheduled course lectures, in the final exam period allocated to this course, or in some combination of these two options. The precise schedule will be decided based on the final course roster and a poll of student preferences, and will be announced on or before **Thursday, March 16**.

Grades: Course grades will be based on the problems received from each student and on the end-of-semester presentation.

5. ACADEMIC HONESTY

All UIC students (graduate and undergraduate) are required to maintain the standards of academic integrity described in the *Guidelines Regarding Academic Integrity*:

<https://dos.uic.edu/docs/Guidelines%20for%20Academic%20Integrity.pdf>

Any violation of these standards will be handled in accordance with the *Student Disciplinary Policy*:

<https://dos.uic.edu/docs/Student%20Disciplinary%20Policy.pdf>