

Proseminar - Introduction to Complex Dynamics

The study of the dynamics of functions in one (or several) complex variable(s) has a long history that goes back to the early 19th century. It has ever since been a very active field of mathematical research. It is closely intertwined with many other fields such as classical complex analysis, topology, fractal geometry, group theory, differential geometry, and measure theory.

In this seminar, we will read and present selected chapters of John Milnor's famous and beautiful introductory book *Dynamics in One Complex Variable* (3rd edition). Prerequisites for the seminar are the courses Analysis I - IV; Lineare Algebra I - II; Algebra und Geometrie I - II. The seminar takes place on Thursdays, 3:15 - 5 pm, in PER 08, Room 2.52.

The grading system for this course is *pass/fail*, there will not be numeric grades. In order to pass the course, every participant is required to: attend the seminar regularly; give one talk (alone) or two talks (in a team of two); write one meeting summary in LaTeX. Further details will be given during the initial meeting. Attendance of the initial meeting on September 22nd is mandatory for participation in this course.

Our tentative schedule is as follows:

(Last updated: 09/21/2022)

Week	Date	Sec.	Topics	Speakers
1	09/22	-	Initial meeting (admin, Latex, and introduction)	AI
2	09/29	1	Uniformization and automorphism groups	
3	10/06	2,3	Universal covers and quotients; Montel's Theorem	
4	10/13	4	Fatou and Julia set on the Riemann sphere	
5	10/20	(2,3),5	Dynamics on hyperbolic surfaces	(AI)
6	10/27	6,7	Dynamics on Euclidean surfaces, smooth Julia sets	
7	11/03	8	Geometrically attracting and repelling fixed points	
8	11/10	9	Böttcher's Theorem and polynomial dynamics	
9	11/17	10	Parabolic fixed points	
10	11/24	11	Cremer points and Siegel discs	
11	12/01	12	The holomorphic fixed point formula	
12	12/08	13,14	Periodic orbits and repelling cycles	
13	12/15	15,16	The structure of the Fatou set	
14	12/22	-	Buffer / Exercises / Abschluss	

Please feel free to reach out with any questions or concerns: annina.iseli@unifr.ch