

Seminar: Fractal Geometry/Fraktale Geometrie

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The objective of this seminar is to introduce the students to the theory of fractals and its applications. This seminar is based on Falconer's wonderful book Falconer [Fal14]. Here is the plan of talks.

20.10.2021 INTRODUCTION AND PLANNING. (Thomas Walpuski)

THEORY.

27.10.2021 BOX-COUNTING DIMENSION. (Dominik Gutwein)

[Fal14, §2]; WP: Minkowski–Bouligand dimension

3.11.2021 HAUSDORFF MEASURE AND DIMENSION. (Benjamin Cereda, Romy Merkel)

[Fal14, §1.3 and §3]; WP: Hausdorff dimension

10.11.2021 TOOLS AND TECHNIQUES FOR CALCULATING DIMENSIONS. (Sarah Pestkowski)

[Fal14, §4]

17.11.2021 LOCAL STRUCTURE OF FRACTALS. (Antonia Dix)

[Fal14, §5]

24.11.2021 PROJECTIONS AND PRODUCTS OF FRACTALS. (Lennard Köhler, Pei Congcong)

[Fal14, §6 and §7]

1.12.2021 GENERIC INTERSECTIONS OF FRACTALS. (Zhengxiong Cao)

[Fal14, §8]

APPLICATIONS AND EXAMPLES.

8.12.2021 ITERATED FUNCTIONS SYSTEMS I. (Jonas Heines)

[Fal14, §9.1-9.3]

15.12.2021 ITERATED FUNCTIONS SYSTEMS II. (Jiaming He)

[Fal14, §9.4-9.6]

- 5.1.2022 APPLICATIONS IN NUMBER THEORY. (Martin Neumann)
[Fal14, §10]
- 12.1.2022 FRACTAL GRAPHS OF FUNCTIONS. (Dunjian Li)
[Fal14, §11]
- 19.1.2022 THE KAKEYA PROBLEM, VITUSHKIN'S CONJECTURE, CONVEX FUNCTIONS, AND FRACTAL GROUPS. (Lukas Gradl)
[Fal14, §12]
- 26.1.2022 DISCRETE DYNAMICAL SYSTEMS. (Johannes Hübbers)
[Fal14, §13.1-13.4]
- 2.2.2022 CONTINUOUS DYNAMICAL SYSTEMS. (Lenny Leass)
[Fal14, §13.5-13.7]
- 9.2.2022 JULIA SETS AND THE MANDELBROT SET I. (Perri Zilberman)
[Fal14, §14.1-14.2]
- 16.2.2022 JULIA SETS AND THE MANDELBROT SET II. (TBD)
[Fal14, §14.3-14.5]

References

- [Fal14] K. Falconer. *Fractal geometry. Mathematical foundations and applications*. 2014. MR: 3236784. Zbl: 1285.28011 (cit. on pp. 1, 2)