SYMBOLIC DYNAMICS FOR LOW-DIMENSIONAL SYSTEMS WITH POSITIVE ENTROPY

YURI LIMA

Symbolic dynamics are an important step towards the study of chaotic systems. Uniformly hyperbolic systems do have good symbolic models (Adler-Weiss, Sinai, Bowen, Ratner), and non-uniformly hyperbolic systems have symbolic models (horseshoes) of large entropy (Katok).

Recently, Sarig constructed horseshoes of full entropy for non-uniformly hyperbolic surface diffeomorphisms. His method is based on Bowen's construction for Axiom A diffeomorphisms, and has been extended to surface maps with discontinuities (e.g. Bunimovich billiards) and to three dimensional flows with positive speed (e.g. geodesic flows on surfaces). This minicourse will consist of the following:

- Lecture 1: Main results and applications.
- Lecture 2: Bowen's method of pseudo-orbits, Sarig's method (part 1).
- Lecture 3: Sarig's method (part 2).
- Lecture 4: Surface maps with discontinuities, 3–dim flows with positive speed.

References

[1] **R. Bowen**, *Equilibrium states and the ergodic theory of Anosov diffeomorphisms. Second revised edition. With a preface by David Ruelle. Edited by Jean-Ren Chazottes*, Lecture Notes in Mathematics, 470 (2008).

[2] **A. Katok**, *Lyapunov exponents, entropy and periodic orbits for diffeomorphisms*, Inst. Hautes Études Sci. Publ. Math. No. 51 (1980), 137–173.

[3] **F. Ledrappier, Y. Lima and O. Sarig**, *Ergodic properties of equilibrium measures for smooth three dimensional flows*, Comment. Math. Helv. **91** (2016), no. 1, 65–106.

[4] **Y. Lima and C. Matheus**, *Symbolic dynamics for non-uniformly hyperbolic surface maps with discontinuities*, 35 pages, available at http://arxiv.org/abs/1606.05863.

[5] **Y. Lima and O. Sarig**, *Symbolic dynamics for three dimensional flows with positive entropy*, 48 pages, available at http://arxiv.org/abs/1408.3427.

[6] **O. Sarig**, *Symbolic dynamics for surface diffeomorphisms with positive entropy*, J. Amer. Math. Soc. **26** (2013), no. 2, 341–426.