Thematic Program on
Dynamical Systems
School of Mathematics, IPM, Tehran
February-May 2017

IPM
Institute for Research in Fundamental Sciences

Mini Course

Cocycles over hyperbolic dynamical systems, group actions and random walks on manifolds

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Schedule:	Lectures 1 & 2: Tuesday, May 16, 2017, 15:00–18:00 Lectures 3 & 4: Thursday, May 18, 2017, 15:00–18:00
Venue:	Lecture Hall 2, IPM Niavaran Bldg., Niavaran Square, Tehran

Abstract. In hyperbolic dynamics there is a general (and vague) idea that can be summarized saying with the following sentence:

> *Most of the dynamically interesting information on a hyperbolic system is concentrated in its periodic orbits.*

In this mini-course we shall mainly deal with cocycles over hyperbolic dynamical systems and discuss some results supporting this idea (like Livšic type theorems) and some others contradicting it.

Finally, we shall discuss some applications of these techniques to the study of finitely generated groups of diffeomorphisms and random walks on manifolds.

The fundamental references for the mini-course are the following: [Liv72], [Has02], [AV10], [Kal11], [KP16], [BK16].

References

[AV10] A. Avila and M. Viana, *Extremal Lyapunov exponents: an invariance principle and applications*, Invent. Math. **181** (2010), no. 1, 115–189.

[BK16] L. Backes and A. Kocsard, *Cohomology of dominated diffeomorphism-valued cocycles over hyperbolic systems*, Ergodic Theory Dynam. Systems **36** (2016), 1703–1722.

[Has02] B. Hasselblatt, *Hyperbolic dynamical systems*, Handbook of Dynamical Systems, vol. 1, Elsevier, 2002, pp. 239–319.

[Kal11] B. Kalinin, *Livšic theorem for matrix cocycles*, Ann. of Math. **173** (2011), no. 2, 1025–1042.

[KP16] A. Kocsard and R. Potrie, *Livšic theorem for low-dimensional diffeomorphism cocycles*, Comment. Math. Helv. **91** (2016), 39–64.

[Liv72] A. N. Livšic, *Cohomology of dynamical systems*, Izv. Akad. Nauk SSSR Ser. Mat. **36** (1972), 1296–1320.