

SPECTRUM OF TRANSFER OPERATORS FOR HYPERBOLIC FLOWS

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This course is about spectral properties of semigroups of transfer operators for hyperbolic *flows*. We begin with briefly reviewing some recent results in hyperbolic *discrete* dynamical systems such as Anosov diffeomorphisms and then we explain additional difficulties and interests in the case of hyperbolic flows. After reviewing recent progress obtained by Chernov, Dolgopyat and Liverani, we give the main result, which is roughly

Theorem For any contact Anosov flow, there exists a Hilbert space, which is contained in the space of distributions and contains all smooth functions, such that the associated transfer operators extend naturally to quasi-compact operators on it.

We also give an explicit bound on the essential spectral radius. With this result, we obtain not only exponential decay of correlations, but also a precise asymptotic expansion for decay of correlations up to a remainder term that decays very fast.

The second and third lecture will be devoted to explanation on the proof of the main result. In the second lecture, we will explain the main idea in the proof using a simplified setting, that is, suspension semiflows over angle-multiplying maps on the circle. In the third lecture, we will go into more detailed and technical parts of the proof. In particular, we will explain the definition of the Hilbert space in the main theorem and also how the contact structure helps us in the proof.

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