

SPECTRA OF DIFFERENTIABLE HYPERBOLIC MAPS

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ABSTRACT. In this course, we shall study the spectral properties of transfer operators associated to a C^r hyperbolic diffeomorphism $T : X \rightarrow X$ on a Riemannian manifold X and a C^{r-1} weight $g : X \rightarrow \mathbb{C}$ by $\mathcal{L}\varphi = g \cdot \varphi \circ T$, for $r > 1$. Under a uniform hyperbolicity assumption on T , our goal is to find a space of distributions φ on which we can prove good estimates for the essential spectral radius of \mathcal{L} .

After recalling the motivation and history of this problem we shall present recent joint work with M. Tsujii: Suppose that Ω is an isolated hyperbolic subset for T , with a compact isolating neighborhood $V \subset X$, and that g is supported in V . We introduce Banach spaces of distributions supported on V , which are anisotropic versions of the usual space of C^p functions $C^p(X)$ and of the generalized Sobolev spaces $W^{p,t}(X)$, respectively. Then we show that the transfer operators associated to T and g extend boundedly to these spaces, and we give bounds on the essential spectral radii of such extensions in terms of hyperbolicity exponents. These bounds shed some light on those obtained by Kitaev ten years ago for the radius of convergence of dynamical determinants.

The course will be elementary and there will be no prerequisites beyond integration by parts and L^t spaces. Notes (including a bibliography) will be available on the website in June.

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