Geometric bounds for the regularity of Lyapunov exponents of random products of matrices

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Given a sequence of independent random matrices (L_n) with Bernoulli distribution on the set $\{A_0, A_1\} \subset \mathrm{SL}_2(\mathbb{R})$ we can define the Lyapunov exponent $L(A_0, A_1)$ as the exponential growth rate of the norm of the products $L^k = L_k \cdots L_1$, which defines a continuous functions from pairs $(A_0, A_1) \in \mathrm{SL}_2(\mathbb{R}) \times \mathrm{SL}_2(\mathbb{R})$ to the reals.

Around points (A_0, A_1) with positive Lyapunov exponent and under generic assumptions on the semi-group Γ generated by $\{A_0, A_1\}$, it is well established in the literature that we have α-Hölder continuity of the Lyapunov exponent function for some $\alpha \in (0, 1]$. In particular, questions regarding the achievement of better regularities, such as Lipschitz continuous, can be raised. The purpose of this talk is to answer this in a negative direction showing that these regularities are intrinsically related with the geometric structure of the Furstenberg stationary measures. Guaranteeing upper bounds for the Hölder regularity of the Lyapunov exponent in terms of the Hausdorff dimensions of the Furstenberg stationary measures. This is a joint with P. Duarte.