Dimension of Furstenberg measure of $SL_2(R)$ random matrix products
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Given a probability measure $\mu$ on the space of 2x2 matrices, there is, under mild conditions, a unique measure $\nu$ on the space of lines which is stationary for $\mu$ (this is also the asymptotic distribution of the direction of the major axis of the image of the unit ball under an i.i.d. random matrix product with marginal $\mu$). This measure is called the Furstenberg measure of $\mu$, and is important in many context, from the study of random matrix products to recent work on self-affine sets and measures. Of particular importance are the smoothness and dimension of the Furstenberg measure. In this talk I will discuss joint work with Boris Solomyak in which we adapt methods from additive combinatorics and the theory of self-similar measures to compute its dimension in many cases.