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Bloch functions and the asymptotic variance of the Beurling transform

We study the interplay between the infinitesimal deformations of quasicircles and the integral means spectra. By work of McMullen, in a holomorphic motion of a circle, the second derivative of the Hausdorff dimension is naturally related to asymptotic variance of the Beurling transform. This suggests it natural to conjecture that the maximum asymptotic variance $\sigma^2 = 1$. We prove the expected upper bound, and with fractal approximation construct examples where $\sigma^2 \geq 0.87913$.

The talk is based on a joint work with Oleg Ivrii, Antti Perälä and Istvan Prause.