1120-46-59   **Palle E. T. Jorgensen*** (`palle-jorgensen@uiowa.edu`), Dept Math MLH, University of Iowa, Iowa City, IA 52242. *Probability theory of infinite iterated function systems.*

Abstract: The study of spectral duality for singular measures started long ago with a joint paper, Jorgensen-Pedersen. Subsequently the theme of Fourier bases and fractals was followed up by many researchers,... Dorin Dutkay and more; and by now the subject has branched off in a variety of new directions, some motivated by applications. In the case of affine IFS measures mu, when an associated complex Hadamard matrix is further assumed to satisfy an additional symmetry condition; then the $L^2(mu)$ Hilbert space will have an orthogonal Fourier basis; in other words we get an associated fractal Fourier transform. In order to appreciate the nature of the spectral duality, note that spectral duality holds for the middle-1/4 Cantor measure, but not for its middle-1/3 cousin. Typically the distribution of the associated Fourier frequencies satisfies very definite lacunary properties, in the form of geometric almost-gap distributions; the size of the gaps grows exponentially, with sparsity between partitions. The probabilistic significance will be explored. Use will be made of reproducing kernel Hilbert spaces of analytic functions. (Received February 08, 2016)

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