1021-42-159 **Giorgio Mantica*** (giorgio@uninsubria.it), Department of Physics and Mathematics, Universita' dell'Insubria, Via Valleggio 11, Como, Italy. *Polynomial Sampling of Fractal Measures: I.F.S.–Pade' Approximants and Fourier–Bessel Functions.*

Constructing the Jacobi matrix of a system of orthogonal polynomials on the unit interval leads naturally to a discrete approximation of the orthogonality measure by a sum of atomic measures. Despite the fact that the numerical computation of the Jacobi matrix may require considerable effort and despite the marvelous convergence properties of Gaussian integration, this approximation is rather crude, especially when the sampled measure is singular continuous and one is looking for estimates of its multi-fractal properties.

This limitation can be overcome by finding a system of iterated functions with probabilities (I.F.S.) and the associated invariant measure whose Jacobi matrix coincides, up to finite order, with that of the sampled measure. I adopt a variant of this classical problem—working with affine maps with equal contraction ratios for which I present here a stable solution algorithm.

This new technique is particularly convenient to analyze quantities defined on fractals like the Fourier-Bessel functions (defined as the Fourier transform of the orthogonal polynomials) and their many asymptotics. New results, numerical techniques, and recently formulated conjectures will be presented. (Received September 04, 2006)