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Myung-Sin Song* (msong@siue.edu), Department of Mathematics and Statistics, Southern Illinois University Edwardsville, Edwardsville, IL 62026. *Haar Wavelet-like Analysis with MRA Method Extended to Fractals.*

Extending the Haar wavelet-like analysis with MRA method to both fractals and to discrete hierarchical models to study two computational features: (a) Approximation of the father or mother functions by subdivision schemes, and (b) matrix formulas for the wavelet coefficients where a variety of data will be considered; typically for fractals, convergence is more restrictive than is the case for wavelets. This makes wavelets closely related to fractals and fractal processes. Investigation of the relation between wavelets and fractals and fractal processes has theoretical and practical potential. It has been recently shown (by Palle Jorgensen, Ola Bratteli, David Larson, X. Dai and others) that a unifying approach to wavelets, dynamical systems, iterated function systems, self-similarity and fractals may be based on the systematic use of operator analysis and representation theory. Motivated by hierarchical models and multiscaling, operators of multiplication, and dilations, and more general weighted composition operators are studied. In these models, scaling is implemented by non-linear and non-invertible transformations. This in turn generalizes affine transformations of variables from wavelet analysis and analysis on affine fractals. (Received September 12, 2012)