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Palle E. T. Jorgensen* (jorgen@math.uiowa.edu), Dept of Mathematics, MLH, Iowa City, IA 52242, and **Dorin E Dutkay**. *Signal processing, image processing, and wavelets*.

While there is a known connection between signal/image processing and wavelet algorithms, the talk will stress a number of geometric features which yield sharper estimates for approximations and for recursive algorithms than were previously available. We introduce transforms connecting (a) Hilbert spaces in R^d , i.e., the usual $L^2(R^d)$, (b) sequence l^2 spaces, and (c) Hilbert spaces of periodic functions in one or several variables. The connections are based on signal/image processing and are made via certain intertwining operators. They let us utilize the same matrix algorithms at all three levels, and they yield fast computation of wavelet coefficients, among other things. We will extend the methods to multi-scale structures outside the realm of wavelets, e.g., to Julia sets, to subshifts, and to affine fractals. (Received April 27, 2005)