

Meeting: 1004, Bowling Green, Kentucky, SS 5A, Special Session on Advances in the Study of Wavelets and Multi-wavelets

1004-41-260 **Bruce Kessler*** (bruce.kessler@wku.edu), Department of Mathematic, WKU, 1 Big Red Way, Bowling Green, KY 42101, and **Douglas Hardin**. *Fractal Surface Macroelements for Orthogonal Nonseparable Bases*.

The theory of fractal surfaces is well-developed, and was used by Donovan, Geronimo, and Hardin in 1994 to construct a nonseparable dilation-3 orthogonal scaling vector of approximation order 2. The authors have previously constructed analogous dilation-2 bases, but these bases were extremely “fractal” in the sense that the nowhere-differentiable surfaces just barely met the convergence criteria for continuity.

This presentation will approach the problem of basis construction by building fractal *macroelements* – surfaces built on the same triangular domain that can be pieced together in a continuous fashion. Such bases are adaptable to arbitrary course triangulations of \mathbf{R}^2 , and are generally of short support. We will also illustrate a new, less-“fractal” macroelement-based dilation-2 scaling vector of approximation order 2 that maps well to rectangular data sets. (Received January 25, 2005)