1012-33-89 **Guido L. Weiss*** (guido@math.wustl.edu), Department of Mathematics, Washington University, Box 1146, St. Louis, MO 63130, and **Ilya Krishtal**, **B Robinson** and **Edward N Wilson**. *The Construction of Haar Wavelets in Higher Dimensions.*

Orthonormal wavelets in R^n, $n > 1$, are generated by L functions by first translating each by the integral lattice points and then dilating each by the powers of an expanding matrix a in GL$(n.R)$. It is a natural problem to extend the classical Haar wavelet, psi, and scaling function, phi, to this setting. This can be done easily in case $a = 2I$ by appropriate products of these two functions evaluated at each of the n components of the n-dimensional variable x. Such a wavelet is "separable" and has a number of drawbacks. A harder problem is to construct "non-separable" examples associated with more general dilations and tranlation lattices. Many authors have studied this problem and found Haar-type scaling functions that are characteristic functions of fractal-like sets. We show how one can construct considearbly simpler Haar-type wavelets if we use the ideas involved in "composite wavelets." The latter involve dilations obtained by matrices that are products of the form $(a^j)b$, j an integer, a in GL$(n.R)$ having a "weak" expanding property and b belongs to a subgroup of GL(n, R) having a determinant of absolute value 1. (Received September 11, 2005)